EPA, DTSC, and CDPH reviews (December, 2017) of the Navy's Draft
Parcel B portion of the Radiological Data Evaluation Findings Report Draft (September, 2017)
Hunters Point Naval Shipyard, San Francisco, California

Table of Contents
Below is an explanation of the contents of the individual spreadsheets in this workbook

EPA detailed review of Parcel B Trench Units
Summary of recommendations for individual trench units
Summary of number of survey units recommended for resampling for trench, fill, and building sites
Count of trench units that showed certain types of examples of concerns
Fill units that received soil from trench units recommended for resampling
CDPH and EPA detailed review of 5 fill units that did not receive from trench units recommended for resampling
For each trench unit, this sheet shows only the columns with narrative summary of signs of falsification and signs of failu
(which can raise data quality concerns, even if no sign of falsification is observed)
Simplifed version of Spreadsheet #7 that shows only the score
CDPH review of building site survey units

EPA reviews of Parcel B Trench Units that the Navy did not already recommend for resampling in the September 2017
Overall score of 2 = Recommend resampling, 0 = no significant signs of concerns, and 1 = needs further evaluation (1 was
Please note: This review only includes the trench units that the Navy recommended as No Further Action/Evaluation in t
Trench Unit
TU001
TU002
TU003
TU004

draft Radiological Data Evaluation Findings Report		

an interim score for tracking draft reviews. This is no longer to this final version of comments)

he September, 2017, draft Findings Report. Because the Navy already recommended the other trench ur

Overall score (0,1, or 2)	Box Plots	Q-Q Plots
2	Cs-137 results all low, with multiple negative results - indicating a data quality issue	1) K-40 has some negative results and a different slope, Cs-137 negative results 2) FSS data sets for Ac-228, Bi-214, and K-40 indicate at least two different populations exist
2	Cs-137 results all low, with multiple negative results - indicating a data quality issue	Ac-228, Bi-214, K-40 RAS and K-40 FSS Bias results have a different slope than FSS; FSS Bi-214 has slope breaks indicating multiple populations. Form notes, "Final Systematic samples display characteristics of at least two different data populations for Bi-214"
2	Cs-137 results all low, with multiple negative results - indicating a data quality issue	K-40 FSS has a different slope than other radionuclides FSS (includes negative values) and slope breaks indicating multiple populations
2	Cs-137 results all low, with multiple negative results - indicating a data quality issue	1) K-40 FSS has a different slope than other radionuclides FSS (includes negative values) 2) FSS results for indicate two different populations for Ac-228 and Bi-214. Form notes, "Final Systematic samples display characteristics of at least two different data populations for Ac-228"

iits for resampling, EPA did not perform a similar detailed level of review for those.

Rounds of excavation	Gamma scan or static concerns
1	1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR 3) 34 investigative samples are not in the SUPR or RACR
2	1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR
1	1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR
1	1) Gamma static and scan results were not provided in the SUPR 2) 67 investigative samples results were not in the SUPR or RACR 3) Names of samplers/surveyors not provided in SUPR

On vs offsite lab	Time Series	Suspect name (1=yes, 0=no)	Name, if suspect
Onsite lab results biased high compared to offsite	1 FSS Bi-214 and 1 Ac-228 result at or below 0, 3 FSS K-40, several Cs-137 results below 0	0.5	Name(s) not provided
Onsite Ra-226 results high compared to offsite	1 FSS Bi-214, 3 FSS Ac-228, several Characterization and Bias, several Cs-137 results below 0.	0.5	Name(s) not provided
Inconsistent - offsite lab reported non-detects for sample 1 and 5 for Ac-228; onsite lab reported results at 0.616 pCi/g and 0.215 pCi/g respectively.	None	0.5	Name(s) not provided
Inconsistent - offsite lab data reported at levels lower than data reported form onsite lab.	1 Bi-214 FSS, 3 Ac-228 FSS, and 3 K-40 FSS results below 0. Several Cs-137 results below 0.	0.5	Name(s) not provided

Name, if not suspect	Signs of falsifying (1=Yes, 0=no)	Signs of falsification summary
Name(s) not provided	1	1) No Confirmatory/biased samples were collected with FSS 2) K-40 and Cs-137 had the lowest mean results of any TU in Parcels B & D-2 3) Q Q Plots for FSS results for Ac-228, Bi-214, and K-40 depict at lead two different data populations
Name(s) not provided	1	1) K-40 had second lowest mean results of any TU in Parcels B & D-2 2) Q Q Plots for FSS results for Bi-214 depict at lead two different data populations
Name(s) not provided	1	1) 16 of 18 FSS sample results for Cs-137 were less than zero.
Name(s) not provided	1	1) No Confirmatory/biased samples were collected with FSS 2) Investigative data (67 samples) not provided in RACR or SUPR 3) Q Q Plots for FSS results depict at lead two different data populations for Ac-228, K-40, and Bi-214

Failure to follow workplan (1=Y, 0=N)	Signs of failure to follow workplan
1	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) 34 investigative samples are not in the SUPR or RACR
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Comments - Other
1) Significant data quality problems, indicated by the following: K-40 and Cs-137 had the lowest mean results of any TU in Parcels B & D-2 Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted building 157
1) Significant data quality problems, indicated by the following: K-40 had second lowest mean results of any TU in Parcels B & D-2 Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted building 157
1) Significant data quality problems, indicated by the following: Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted building 140
1) Significant data quality problems, indicated by the following: Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted buildings 140 and 142

Followup needed, e.g. questions for Navy	See additional EPA statistical analysis
Navy should provide missing scan/gamma static data.	
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Navy should provide missing scan/gamma static data.	
Navy should provide missing scan/gamma static data.	

TU005

TU006

TU007

TU008

2	K-40 in FSS appears to be from a different population than all other surveys. Cs-137 results all low, with multiple negative results - indicating a data quality issue	FSS Bi-214 and K-40 results indicate at least two populations
2	Cs-137 results all low, with multiple negative results - indicating a data quality issue	K-40 FSS has a different slope than other radionuclides FSS (includes negative values) Large range of K-40 results . Ac-228, Bi-214, and K-40 have slope breaks indicating multiple populations.
2	1) Cs-137 results all low, with multiple negative results - indicating a data quality issue 2) One outlier for Bi-214 and Ac-228, three outliers for K-40 identified. 3) Three FSS samples have unusually small variance	Slope breaks in K-40 and Ac-228 FSS datasets indicating multiple populations
2	Ac-228 and Cs-137 results low, with multiple negative results - indicating a data quality issue	K-40 FSS has a different slope than other radionuclides FSS (includes negative values)

2	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) Names of samplers/surveyors not provided in SUPR
2	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) Names of samplers/surveyors not provided in SUPR 4) One Bi-214 result in FSS reported at 0. 5) Pb-212 results were higher for TU006 than the average for Parcels B and D-2.
1	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) Names of samplers/surveyors not provided in SUPR 4) TU007 has the highest static count of 9,132 cpm compared to surrounding TUs. No signature form the site RSO was recorded.
1	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) Names of samplers/surveyors not provided in SUPR

Inconsistent - two elevated FSS results for Bi-214 are not comparable to Ra-226 reported results.	Two Bi-214 FSS results elevated compared to Ra-226 result reported.	0.5	Name(s) not provided
Onsite lab data inconsistent with off-site lab data	Inconsistencies noted (e.g., one Bi-214 result below 0)	0.5	Name(s) not provided
Inconsistent - sample 10 had two different collection dates, and reported sample masses were different between onsite and offsite lab. It appears the onsite and offsite labs did not count the same sample.	Inconsistent - sample 10 had a collection date, and reported sample masses were different between onsite and offsite lab. It appears the onsite and offsite labs did not count the same sample. Delayed counting of samples (4 days). One sample was recounted in 2010 as part of a quality review.	1	J. Cunningham
Seven final systematic samples have results at 0 based on offsite lab results. This is inconsistent with onsite. Low activities reported in samples 002, 007, 011, 012, 103; seven FSS samples have results at 0 based on offsite lab results.	Low values for Ac-228, Bi-214, and K-40 on the same day. The K-40 data range large: from 1.03 through 18.74 pCi/g.	0.5	Name(s) not provided

Name(s) not provided	1	1) Two Bi-214 FSS results elevated compared to Ra-226 result reported. 2) FSS results indicate at least two populations are present in Bi-214 data set.
Name(s) not provided	1	1) One Bi-214 result in FSS reported at 0. 2) Pb-212 results were higher for TU006 than the average for Parcels b and D-2.
Name(s) not provided	1	1) Differences in recorded collection date for sample 10; reported sample masses for this sample were different with the offsite lab recording an unusually low mass. It appears the onsite and offsite lab did not analyze the same sample. 2) Delayed counting of samples (12 and 14 through 18) of four days after collection. 3)Sample 10 had 2 collection dates, and reported sample masses were different between onsite and offsite lab. It appears the onsite and offsite labs did not count the same sample. 4) Delayed counting of samples (4 days). One sample was recounted in 2010 as part of a quality review. 5) Several Ac-228 results at or below 0; outliers identified for Ac-228, Bi-214, K-40 indicating potential data quality issues and/or falsification 6) Highest count recorded was 9,132 cpm for location 004. 7) No confirmation/bias samples collected
Name(s) not provided	1	1) Seven FSS samples have results at 0 based on offsite lab results.; eight samples have low activities when compared to TU009.

1	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
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1) Significant data quality problems, indicated by the following: Multiple Cs-137 results at or below 0 2) Offsite lab mass not reported for 6PBFS-005-115 3) Two FSS samples have high Bi-214 outliers.
1) No confirmatory/biased samples collected for FSS 2) One Bi-214 result in FSS was below zero. 3) Large range of K-40 values (2.778 - 19.527 pCi/g) 4) High static count recorded at 9,132 cpm compared to surrounding TUs. Offsite samples from Eberline Services are inconsistent with Ac-228 data from all TUs. 5) Pb-212 results were higher for TU006 than the average for Parcels B and D-2.
1) Scan and static data not provided in RACR or SUPR 2) Names of samplers/surveyors not provided in the SUPR 3) 16 of 18 FSS sample results for Cs-137 were less than zero.
1) Significant data quality problems, indicated by the following: Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted buildings 140 and 130

Navy should provide missing scan/gamma static data.	
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TU009
TU010
TU011
TU012
TU013
TU014

2	Ac-228 and Cs-137 results low, with multiple negative results - indicating a data quality issue	K-40 FSS has a different slope than other radionuclides FSS (includes negative values). Slope breaks in Ac-228, Bi-214, and K-40 data sets suggest different populations.
2	Cs-137 results all low, with multiple negative results - indicating a data quality issue. Bi-214 FSS_SYS has low variability.	None noted
2	Cs-137 results all low, with multiple negative results - indicating a data quality issue	K-40 FSS has a different slope than other radionuclides FSS (includes negative values). Ac-228 and K-40 have slope breaks indicating multiple populations.
2	Cs-137 results all low, with multiple negative results - indicating a data quality issue. Bi-214 FSS_SYS has low variability.	K-40 FSS has a different slope than other radionuclides FSS. Slope breaks in Ac-228 and K-40 data sets indicating multiple populations.
2	Bi-214 and K-40 RAS results look like they are from a different population than other surveys Cs-137 results all low, with multiple negative results - indicating a data quality issue	Ac-228, Bi-214, K-40 RAS data sets have a different slope than other surveys
2	1) Ac-228, Bi-214, and K-40 all have extremely low variance in the FSS results. Potentially indicates falsification 2) Cs-137 results all low, with multiple negative results - indicating a data quality issue	Negative results reported for Ac-228 and Bi-214 RAS survey, altering the slope so variance in populations can not be evaluated visually.

1	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) Names of samplers/surveyors not provided in SUPR
6	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) Names of samplers/surveyors not provided in SUPR
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1	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) Names of samplers/surveyors not provided in SUPR
2	1) Form notes, "Gamma static counts ranged between 4960 and 5536, an unusually narrow range for heterogeneous material. However, the gamma static counts are consistent with the gamma scan range, but are not consistent with the analytical results of the FSS dataset."
5	1) Gamma static and scan surveyor is not listed in the SUPR 2) Names of samplers/surveyors not provided in SUPR

Consistent	1 Bi-214 FSS sample, 3 Ac-228 FSS samples and 1 K-40 FSS results below 0. 2 offsite (Eberline) FSS results at 0. K-40 range is large (-0.905 0 16.84 pCi/g).	0.5	Name(s) not provided
Fairly consistent	None	0	
Offsite and Onsite data within 1 order of magnitude	None noted.	0.5	Name(s) not provided
Acceptable comparable data sets Neither Eberline nor TestAmerica reported the sample mass	Ac-228 and Pb-214 have low means, 1 negative result is reported for Bi-214, Ac-228, and K040.	0.5	Name(s) not provided
Results between offsite and onsite lab compare within 1 order of magnitude (10X). However, one sample was counted by the off-site lab more than 2 years later	1 Ac-228 FSS result below 0.	0	Name(s) not provided
The Data Eval form states "Onsite / offsite data is satisfactorily comparable (within a factor of 10x)."	1 Bi-214 FSS result below 0.	0.5	Name(s) not provided

Name(s) not provided	1	1) Two samples counted one day. Remaining samples counted 3 days later.
C. Fluty	1	1) Form notes, "FSS samples (247 and 257) analyzed on 6/22/2007. • FSS samples (246, 251, 258, 250, 252, 256, 253, 254, 259, 261, 262, 255, and 260) analyzed on 6/23/2007. • FSS samples (258 and 263) analyzed on 6/26/2007." Analysis of samples on different days suggests potential substitution.
Name(s) not provided	1	1) 11 samples counted 7 months later; potential for substitution.
Name(s) not provided	1	1) Different populations for K-40, Ac-228 and very low variability for Bi-214 FSS data set.
J. Rosenhagen	1	1) Box Pots and QQ plots of RAS results for Ac-228, Bi-214, and K-40 appear to be from a different population than other surveys 2) Th-232 decay chain radionuclides are not in equilibrium in the FSS. 3) The Data Eval Form states in Section 4 "Gamma static counts ranged between 4960 and 5536, an unusually narrow range for heterogeneous material. However, the gamma static counts are consistent with the gamma scan range, but are not consistent with the analytical results of the FSS dataset." The inconsistencies in the pattern of data ranges and lack of comparable results indicates falsification most likely occurred.
Name(s) not provided	1	1) Ac-228, Bi-214, and K-40 all have extremely low variance in the FSS results. The unusual small variance in results can not be explained by any reasonable argument, therefore the reviewer believes this is an indication of falsification 2) Missing scan and static data in SUPR, in addition to the noted lack of normal variability in the FSS results for Ac-228, Bi-214, and K-40 indicate the data may have been falsified. Additionally, TU014 underwent at least five excavations. The need to perform multiple excavations and sampling may have provided a motive for falsifying results.

1	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1	1) RSO Signature missing from Gamma Static and Scan Data. 2) All samples analyzed in June 2007 except for one analyzed on October 8, 2010
1	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1	1) Sampler/surveyor name not provided in Work Plan.
1	1) Gamma static and scan surveyor is not listed in the SUPR 2) No FSS Bias samples collected

1) Significant data quality problems, indicated by the following: Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted buildings 140 and 130
1) 11 samples recounted 7 months later. No explanation for this.
1) FSS Results for the thorium series included two negative Ac-228 results, Bi-212 at 0.47 pCi/g, and Tl-208 at 0. These concentrations do not indicate that the Th-232 decay chain is in equilibrium as would be expected for native soils. This data indicates there are data quality issues, and may also be associated with falsification of results. 2) Sample 6PBFS-013-29 counted onsite on 10/02/06, and recounted about 2 years later on 12/01/08 by offsite lab. 3) Fss-SYS, FSS-BIAS and RAS samples all collected on 9/25/2006
This TU014 was located downstream and/or was connected to a radiologically-impacted building (Bldg. 114), indicating a higher likelihood that the Sewer lines and trench were radiologically contaminated.

Navy should provide missing scan/gamma static data.	
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1) Item 4 on the Data EvalForm states that gamma static counts ranged between 4960 and 5536 which is unusually narrow but is consistent with the gamma scan range, but not consistent with the analytical results. Please explain. 2) Sample 6PBFS-013-29 counted onsite on 10/02/06, and recounted about 2 years later on 12/01/08 by offsite lab.	
Navy should provide missing scan/gamma static data.	

TU015

TU016

TU017

0	Cs-137 results all low, with multiple negative results - indicating a data quality issue	Ac-228 and Bi-214 FSS_SYS have slope breaks, indicating multiple populations
2	1) Data Eval Form states, "Final systematic samples within the normal distribution. One outlier was identified for Ac-228." 3) Cs-137 results all low, with multiple negative results - indicating a data quality issue	Ac-228, Bi-214, K-40, Cs-137 FSS data sets have some negative results, indicating data quality issues. AC-228, B-214, and K-40 data plots have slope breaks indicating multiple populations.
2	Cs-137 results all low, with multiple negative results - indicating a data quality issue	K-40 FSS_SYS has slope breaks indicating multiple populations.

3	1) Gamma static and scan results were not signed by the RSO
1	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) Names of samplers/surveyors not provided in SUPR
1	1) Form notes, "The static survey was dated 11/28/2007. The survey date seems to be a mistake. The FSS samples were collected on 11/28/2006. The static survey was approved on 3/6/2008 as indicated in Attachment 1 of the SUPR document. The highest count was recorded at 6.126 cpm for sample location 081. No signature from the site RSO was recorded on this survey." 2) Gamma static and scan surveyor is not listed in the SUPR 3) Names of samplers/surveyors not provided in SUPR

The Data Eval Form states "The comparison results for samples (110 and 124) were not equivalent for K-40, Ac-228, and Bi-214."	The Data Eval Form Section 3 (Bi-214) states "One sample seems to be inconsistent with the overall data population. Sample 119 has a result below 0. Two samples 110 and 113 were the highest at 1.479 and 1.455 pCi/g, respectively."	0	Name(s) not provided
The data are not consistent for Ac-228 and K-40; the offsite lab results included zero values for Ac-228.	1 Ac-228 FSS result is below 0, K-40 range large (5.28 - 21.18 pCi/g).	0.5	Name(s) not provided
The Data Evaluation Form states "The offsite lab is inconsistent with the onsite data for Ac-228 results because the offsite lab did not detect Ac-228 in certain samples. This inconsistency by the offsite lab is not evidence of potential data falsification by the onsite staff." The reviewer notes that while the fact that the offsite lab analysis was inadequate to detect Ac-228 does not necessarily indicate falsification, it does indicate a lack of reliability of the data, which is equally problematic if the data is not deemed usable for the intended purpose of demonstrating compliance with the ROD.	None noted.	0.5	Name(s) not provided

P. Vigil	1	1) The Data Eval Form states "The comparison results for samples (110 and 124) were not equivalent for K-40, Ac-228, and Bi-214." 2) FSS samples (111 through 115, 117 through 124 and 127) were counted on 1/7/2007. Sample 125 was counted on 9/10/2010. Only samples 110, 116, and 126 were counted within 2 working days on 12/21/2006. The Christmas and New Year's holidays occurred during this period.
Name(s) not provided	1	1) Missing scan and static data and signature of surveyors or samples missing 2) Inconsistency between offsite and onsite lab results between onsite and offsite lab, large range of K-40 values 3) Long time interval between when samples 066, 068, 073, and 078 were collected (2006) and analyzed (9/13/10). Data Eval Form states "FSS samples (066, 068, 073, and 078) were analyzed on 9/13/2010. The sample collection date was on 12/28/2006.
Name(s) not provided	1	1) Logic Test 4 states FSS samples 072, 076, 077, 079, 080, and 081 analyzed within 2 working days. FSS samples 064, 065, 070, and 075 were analyzed on 12/1/2006. FSS samples 067, 069, 073, and 078 were analyzed on 9/13/2010. The analysis of samples over 3 years later is suspicious. 2) The approval data for the Static Survey of 3/6/2008 pre-dates when the Static Survey was conducted on 11/28/2006. The Data Evaluation Form states "The survey date seems to be a mistake." However, the reviewer notes that the difference in dates is unusual and can not be dismissed under an assumption that this was a mistake. 3) The Data Evaluation Form states "The scan survey was performed on 11/28/2007. The survey date seems to be a mistake. The FSS samples were collected on 11/28/2006". The reviewer notes that given the fact that the scan, static, and FSS survey/sample collection dates do not follow the expected chronological order, this is evidence of falsification of data. 4) The Data Evaluation Form states "The K-S Test Flagged Pb-214, which was reported at higher concentrations than other survey units in Parcel B." The reviewer notes that a higher Pb-214 indicates elevated Ra-226 is present. Further investigation will be needed to identify what value of Ra-226 was reported by the lab compared to the elevated Pb-214 result in order to determine if this is an indication of data falsification or a data quality issue.

1	1) Scan and static measurement data did not contain the RSO signature.
1	1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) Names of surveyors/samplers not provided in SUPRs.
1	1) RSO signatures are missing from Static and Scan Survey data. 2) Sampler/Surveyor names are missing from the SUPR.

1) The Data Eval Form 'Summary of Findings' Summary of Findings states "The mean results for Bi-212, Pb-212, and Ac-228 were all higher than average for Parcel B...."The Bi-214 and Pb-214 mean results were also higher than average for Parcel B.." 2) One Bi-214 result was negative and offsite and onsite analyses of samples 110 and 124 are not consistent. 3) Soil probably used as backfill on Parcel C.
1) The Summary of Findings states "The K-S Test Flagged Pb-214, which was reported at higher concentrations than other survey units in Parcel B." A higher Pb-214 indicates elevated Ra-226 is present. The Data Eval Form does not state if the Pb-214 and Ra-226 results from the analysis were comparable. This information would provide insight into whether results in TU017 were falsified or not.

Navy should provide missing scan/gamma static data.	
1. Section 4 states "The static survey was dated 11/28/2007. The survey date seems to be a mistake. The FSS samples were collected on 11/28/2006. The static survey was approved on 3/6/2008 as indicated in Attachment 1 of the SUPR document. The highest count was recorded at 6.126 cpm for sample location 081. No signature from the site RSO was recorded on this survey." These statements are contradictory, stating the gamma static survey was approved on 3/6/08 but then stating the site RSO signature is missing. 2) The Summary of Findings states "The K-S Test Flagged Pb-214, which was reported at higher concentrations than other survey units in Parcel B." A higher Pb-214 indicates elevated Ra-226 is present. The Data Eval Form does not state if the Pb-214 and Ra-226 results from the analysis were comparable. This information would provide insight into whether results in TU017 were falsified or not. Can the Navy provide this information? 3)Where is the missing data and why was it not included in the SUPRs?	

TU018

TU019

2	Cs-137 results all low, with multiple negative results - indicating a data quality issue	K-40 FSS_SYS has slope breaks indicating multiple populations.
2	Cs-137 results all low, with multiple negative results - indicating a data quality issue. Bi-214 FSS_SYS and FSS_Bias have low variability. Ac-228 and K-40 FSS_Bias have higher mean and lower variability than the FSS_SYS data set.	Ac-228, K-40, and Cs-137 data sets include negative values, indicating data quality issues. Ac-228, Bi-214, and K-40 FSS_SYS plots have slope breaks indicating multiple populations.

2	1) Gamma static survey was performed on 12/21/2006 prior to the collection of the FSS samples. The static survey was approved on 5/12/2007." "No signature from the site RSO was recorded on this survey." 2) Names of samplers not provided in SUPR. The reason the Gamma Static Survey was conducted in December 2006 but not approved until May 2007 was not discussed in the Data Evaluation Form. In addition, the Data Eval Form states the static survey was approved, but also states the site RSO signature is missing. It is unclear what personnel approved the survey data and whether such staff was qualified to approve radiological data in lieu of the RSO. Also, the highest gamma static result, 6112 cpm, is below the range of gamma scan data, 4,800 to 7,000 cpm, which is suspicious.
1	1) Gamma static and scan date and time not provided in the SUPR 2) Gamma scan survey was performed on 9/29/06 at 1013, during FSS sample collection. Collection of scan data at the same time that FSS samples are collected is suspicious because the MARSSIM approach requires the gamma scan data be collected to inform the development of a sufficiently robust FSS survey design.

1) Ac-228 data generated onsite is inconsistent with Ac-228 data from offsite laboratory. 2) Form also notes, "All FSS samples (048 through 065) collected on 12/21/2006. However, two FSS samples (055 and 065) were reported from the offsite lab with a collection date of 12/19/2006."	1) One Ac-228 FSS result was reported below 0.	1	R. Roberson
1) The Data Evaluation Form states that the data are consistent. 2) However, the form notes, "For Final Systematic Sample 014, the onsite/offsite (Eberline) mass amounts agree. Eberline received both samples 014 and 027 on the same date (11/3/06); however, for sample 027, the Eberline reported mass (325 grams) is 102 grams less than the initial onsite mass of 427 grams."	Two Ac-228 FSS results are reported near 0.	0	Name(s) not provided

Name(s) not provided	1	1) The Data Evaluation Form Summary of Findings states "The K-S test flagged Pb-214, Ac-228, and Pb-121. These radionuclides, plus Bi-214 and Bi-212, presented higher-than-average results in TU018 compared to the rest of Parcel B. High results are not considered to be evidence of potential data falsification." The reviewer notes, however, that elevated concentrations of Bi-214 and Pb-214 indicate the presence of elevated Ra-226, but the Data Evaluation Form does not state if comparable Ra-226 results were reported and if so, if these levels exceeded the release criteria. Elevated levels of Bi-212 and Ac-228 indicate elevated concentrations of Th-232, however the Data Evaluation Form has not stated if this is the case or if the data are deemed to be anomalous. Further investigation by the Navy is needed. 2) The Data Evaluation Form Logic Test 4 provides FSS analysis dates, as follows: "FSS samples 048 through 052, 054, 055, 056 through 062, 064, and 065 were analyzed on 1/7/2007. ... FSS sample 063 was analyzed on 1/4/2007." Analysis of one sample on 1/4/07 suggests potential for substitution.
P. Vigil	1	1) On- and offsite samples had a different weight for sample 027 (difference of 102 grams). 2) Bi-214, K-40, Bi-212, all had the 3rd lowest results of all the TUs in Parcels B & D-2. In addition, Pb-214 mean results is the lowest of all TUs in Parcels B & D-2. The Data Evaluation Form argues that adjacent TU012 also had abnormally low mean concentrations in an area where the two TUs adjoin and therefore may represent a different soil type is represented rather than an indication of falsification. The reviewer acknowledges this may be the case but with the existing data, and the extensive data quality issues highlighted in data throughout Parcel B, sufficient information does not exist to determine the reason for the low values. The reviewer also notes that it is also possible the unusually low mean values for this data may be due to falsification.

1	1) Site RSO signature missing from Gamma Static and Scan data in the SUPR.
1	1) Gamma static and scan surveyor is not listed in the SUPR

Resample due to different collection dates for samples for on- and off-site labs and uncertainty due to multiple populations in K-40 data.

1) The Data Evaluation Form Summary of Findings states "The K-S test flagged Pb-214, Ac-228, and Pb-121. These radionuclides, plus Bi-214 and Bi-212, presented higher-than-average results in TU018 compared to the rest of Parcel B. High results are not considered to be evidence of potential data falsification." The reviewer notes, however, that elevated concentrations of Bi-214 and Pb-214 indicate the presence of elevated Ra-226, but the Data Evaluation Form does not state if comparable Ra-226 results were reported and if so, if these levels exceeded the release criteria. Elevated levels of Bi-212 and Ac-228 indicate elevated concentrations of Th-232, however the Data Evaluation Form has not stated if this is the case or if the data are deemed to be anomalous. Further investigation by the Navy is needed.	

TU020

TU021

TU022

TU023

2	1) For Bi-214, FSS_SYS and FSS_Bias have low variability and FSS_Bias has a lower mean. For K-40, the opposite is true, FSS_Bias has higher variability - suggesting potential multiple sources of samples. 2) Cs-137 results all low, with multiple negative results - indicating a data quality issue.	Ac-228, K-40, and Cs-137 data sets include negative values, indicating data quality issues in the analysis. However, there are obvious slope breaks in the FSS_SYS data set for K-40, suggesting multiple populations.
2	1) Bi-214 results have very low variability. Form notes, "Bi-214 standard deviation is unusually low (0.11 pCi/g) for Final Systematic samples." 2) Cs-137 results all low, with multiple negative results - indicating a data quality issue.	1) Ac-228 and K-40 data sets include negative values. May indicate data quality issues. However, K-40 data set has slope breaks indicating multiple populations. 2) Form notes, " Bi-214 plot is unusually horizontal (low variance – 0.34) for Final Systematic samples."
0	1 For Bi-214, FSS_SYS and FSS_Bias samples have low variability. Also, for Bi-214, FSS_Bias samples have lower variability and mean than FSS_SYS samples. However, for K-40, FSS-Bias samples have a higher mean and higher variability than the FSS_SYS samples. 2)Cs-137 results all low, with multiple negative results - indicating a data quality issue	Ac-228 and K-40 data sets include negative values, indicating data quality issues.
2	1. No Cs-137 plots from Navy 2. Very low variability for Bi-214	Characterization samples appear to be a different population. K-40 sets have different slopes, suggesting different populations

1	1) Gamma static and scan date and time not provided in the SUPR 2) Gamma Static Survey data ranged between 5,583 and 6,708 cpm. The Data Evaluation Form states this range is consistent with the gamma scan data; however the scan survey data ranged from 4.200 and 7,100 cpm. Therefore, the Static data is not consistent with the scan data since the range for the static surveys is very small compared to the scan data and what would be expected for environmental surveys of land areas.
1	1) Gamma static and scan date and time not provided in the SUPR 2) Gamma static and scan range of data values too narrow for measurement of heterogeneous environmental land areas.
1	None.
4	No name listed for either scan or static gamma measurements

The Data Evaluation Form states "[N]o direct comparison could be made between onsite and offsite data." The reviewer requests the Navy provide clarification regarding this statement.	3 Ac-228 Biased results below or near 0.	0	Name(s) not provided
For the FSS sample 06, the onsite/offsite K-40 results differ by more than a factor of 10x (7.796 vs. 0.707). Other data compares satisfactorily. The reviewer notes that having radionuclides of concern have comparable values between onsite and offsite data, but very different K-40 results has been proven in the past to be an indication of data falsification and is highly suspect for TU021.	1 Ac-228 FSS result below 0.	1	A. Jahr
Data Evaluation Form states "Data comparable with the following exception: 6PBFS-022-34 Pb-210 value (0.18 vs 4.0189 pCi/g).	2 Ac-228 FSS results below 0.	0	Name(s) not provided
		0.5	No name provided

P. Vigil	1	1) Gamma static and scan date and time not provided in the SUPR 2) Gamma Static Survey data ranged between 5,583 and 6,708 cpm. The Data Evaluation Form states this range is consistent with the gamma scan data; however the scan survey data ranged from 4.200 and 7,100 cpm. Therefore, the Static data is not consistent with the scan data since the range for the static surveys is very small compared to the scan data and what would be expected for environmental surveys of land areas. 3) Suspect worker involved in data collection at TU020.
Name(s) not provided	1	1) Gamma Static Survey data ranged between 5,728 and 6,427 cpm. In contrast to the Data Evaluation Form for TU0020, the Data Evaluation Form for this TU 0021 states this range is an unusually narrow range for heterogeneous soil but is consistent with the gamma scan range and the FSS dataset. Scan survey data ranged from 5.200 and 6,800 cpm. The reviewer notes that the Static and Scan data have too narrow of a range and therefore is suspect for falsification. 2) For the FSS sample 06, the onsite/offsite K-40 results differ by more than a factor of 10x (7.796 vs. 0.707). Other data compares satisfactorily. The reviewer notes that having radionuclides of concern have comparable values between onsite and offsite data, but very different K-40 results has been proven in the past to be an indication of data falsification and is highly suspect for this TU021. 3) Section II, Item 2 of the Data Evaluation Form states "Final Systematic samples from this TU contain low mean concentrations of Bi-214, K-40, Pb-212, and Pb-214 compared to other TUs in Parcels B & D02. In addition, the fact that TU020 and TU021 were sampled on the same day likely resulted in the disparity between Units and Days flags.
P. Vigil	0	
No name provided	1	1) Some samples were counted between 03/14/2207 and 03/19/2007. Samples #174, #179, #181-183 were counted on 09/09/2010 and 09/10/2010. 2) No name of static or scan surveyor provided in SUPR

1	1) Gamma static and scan date and time not provided in SUPR.
1	Numerous discrepancies noted in the data (i.e., unusually low values and data ranges, negative Ra-226 values), discrepancies in K-40 results between onsite and offsite labs, yet no other sampling was conducted to confirm conditions at TU021.
1	None.
1	1) 2) No name of static or scan surveyor provided in SUPR 2) Some samples were counted between 03/14/2207 and 03/19/2007. Samples #174, #179, #181-183 were counted on 09/09/2010 and 09/10/2010.

Form notes, "Ac-228 mean result is the lowest of all TUs in Parcels B & D-2. ... Bi-214 mean result is 3rd lowest of TUs in Parcels B & D-2. ... K-40 mean result is 3rd lowest of TUs in Parcels B & D-2. ... Pb-212 mean result is 3rd lowest of TUs in Parcels B & D-2. ... Pb-214 mean result is the lowest of all TUs in Parcels B & D-2." Form concludes these are within the expected ranges.
1) TU0021 contained the sewer line that was connected to or downstream from the radiologically-impacted Building 103. 2) Section II, Item 2 of the Data Evaluation Form states "Final Systematic samples from this TU contain low mean concentrations of Bi-214, K-40, Pb-212, and Pb-214 compared to other TUs in Parcels B & D02. In addition, the fact that TU020 and TU021 were sampled on the same day likely resulted in the disparity between Units and Days flags. 3) Section II, item 2 of the Data Evaluation Form states that a review of the Ra-226 data shows that the Ra-226 concentrations in several samples have large negative values and are "apparently statistically indistinguishable from the remediation action level." The reviewer notes that large negative values of the Ra-26 data indicates a data quality issue and therefore such data is not reliable for decision making/demonstrating the ROD criteria has been met.
As in all other TUs, significant data quality issues exist, making the data unreliable for decision making and in demonstrating compliance with the ROD release criteria.
FSS samples could have been substituted in 2010 when recounted 3 years after collection. Recommend resampling due to low variability Bi-214 and uncertainty about recounted samples.

The Data Evaluation Form states "[N]o direct comparison could be made between onsite and offsite data." The reviewer requests the Navy provide clarification regarding this statement.	
Section II, Item 2 of the Data Evaluation Form states "Final Systematic samples from this TU contain low mean concentrations of Bi-214, K-40, Pb-212, and Pb-214 compared to other TUs in Parcels B & D02. In addition, the fact that TU020 and TU021 were sampled on the same day likely resulted in the disparity between Units and Days flags. Reviewer requests further clarification of the statements and where information about a disparity between units and days can be found.	

TU024

TU025

TU026

TU027

2	For Bi-214, biased samples have lower variability than FSS_SYS	FSS_SYS has slope break indicating different populations and slope different than biased samples for Bi-214.
0		K-40 high variability and range
0	Several Final Systematic Bi-214 samples present as outliers	Bi-214 Final Systematic samples indicate the potential for at least two different data populations.
0	Bi-214 has low variability	Slope break or outliers in K-40 plot

1) Excavation of TU24 was initiated on 09/25/2006 in trench segment 06-B07-24-1C. Excavation was completed on 10/24/2006. Eighteen systematic FSS soil samples were collected from TU24 and submitted to the laboratory for analysis by gamma spectroscopy on 11/16/2006. 2) 1,248 ft3 excavated	1) Date and time of static survey not provided in the SUPR. The static survey results ranged from 4,000 to 6,800 gcpm, which was consistent with scan survey results and FSS sample results. 2) Gamma survey results ranged from 3,800 to 6,800 gcpm, which was consistent with static survey results and FSS sample results. No measurements above the investigation level of 7,300 gcpm were identified during the performance of gamma scans in Trench Unit 24. Scan survey performed on 11/16/2006 at 09:30 (from scan record) prior to collection of most final systematic samples. The following samples were collected prior to static survey: 6PBFS-024-99, -100, -101, and -102.
1	Static survey date and time not provided in SUPR.
1	Scan survey performed on 12/14/2006 at 09:30 during FSS sample collection. Gamma Scan range is narrow but consistent with static measurements and the FSS dataset and less than the 3-sigma threshold.
1	1) Static survey date and time not provided in SUPR Gamma static dataset consistent with scan data and Final Systematic sample dataset. 2) Scan survey performed on 11/04/2006 at 10:15 during Final Systematic sample collection. Gamma scan dataset consistent with static data and Final Systematic sample dataset.

Sample 6PBFS-024-114 has an onsite lab mass of 320 g and an offsite lab mass of 327 g. The offsite lab did not report a mass for sample 110.		1	R. Zahensky
		1	R. Zahensky
		0	No name listed
		1	R. Roberson

No name provided	2	1) FSS samples were collected on 11/16/2006. FSS confirmatory/biased samples were collected on 11/01/2006. 2) One final systematic sample has a result below 0 for Bi-214. Sample may have been substituted 3) on- and off-site lab sample had different weights
No name provided	1	1. Samples were counted onsite 10/13/2006, with the exception of #2, #6, and #12, which were counted on 09/13/2010. Sample #14 was counted offsite on 11/22/2008. Substitution possible.
J. Rosenhagen	0	
No name provided	1	Form notes, "FSS samples excluding #2 and #3 were counted onsite from 11/07/2006 to 11/09/2006. FSS samples #2 and #3 were counted on 09/21/2010. Sample #16 was counted offsite on 11/25/2008."

1	No static survey date and time, no sampler name.
1	No static survey date and time, no sampler name.
0	
1	No static survey date and time, no sampler name.

Recommend resampling due to uncertainty - different sample masses, low variability for Bi-214
Some uncertainty because samples counted over 4 years. 2010 counts may be due to recounting at request of Navy or CDPH.
Several Final Systematic Bi-214 samples present as outliers
FSS samples excluding #2 and #3 were counted onsite from 11/07/2006 to 11/09/2006. FSS samples #2 and #3 were counted on 09/21/2010. Sample #16 was counted offsite on 11/25/2008.

TU028
TU029
TU030
TU033
TU036
TU037
TU039

0	Bi-214 has low variability	Slope breaks on K-40 plot, may be 3 or more populations
0		Slope breaks on Ac-228, Bi-214, K-40 plots, indicating as many as 3 populations.
0	Bi-214 has low variability	Slope breaks on K-40 plot, may be 3 or more populations
0		Slope breaks on Ac-228, Bi-214, K-40 plots, indicating as many as 3 populations.
0		Slope breaks on Ac-228, Bi-214, K-40 plots, indicating as many as 3 populations.
2	Bi-214 FSS_SYS has lower variability than other sets	Each data set has a different slope on the K-40 plot, and to some extent on the Ac-228 and Bi-214 plots. Slope breaks on Bi-214 and K-40 plots suggest different populations.
2	1. For Bi-214, FSS_Bias have lower mean than FSS_SYS. For K-40, FSS_Bias have lower variability and a much lower mean.	1. For Ac-228 and K-40, FSS_SYS and FSS_Bias have very different slopes, suggesting data came from very different populations. FSS_SYS has slope breaks indicating different populations in that set. 2. Form notes, "For Ac-228 FSS samples, the regression line is more vertical than expected (high variability)."

1	Static survey date and time not provided in SUPR. Scan survey performed on 11/07/2006 at 08:00 during Final Systematic sample collection. Gamma scan dataset consistent with static data and Final Systematic sample dataset.
1	1. No signature from the site radiation safety officer (RSO) was recorded for static or gamma scan surveys. 2. Gamma scan fairly narrow range.
1	Static surveyor name not provided in SUPR.
1	Static survey date and time not provided in SUPR.
1	
2	Form notes that the gamma static form was undated.
1	Form notes, "Static survey date and time not provided in SUPR. "

Form notes, "FSS samples excluding #5, #9, and #15 were counted onsite on 11/08/2006. Sample #5 was counted onsite on 09/20/2010 and was analyzed offsite by Eberline on 12/11/2006. Sample #9 was counted onsite on 09/13/2010. Sample #15 was counted on 10/08/2010. Sample #12 was counted offsite by Eberline on 12/11/2006 and offsite by TestAmerica on 11/24/2008. "		1	R. Zahensky
		0	No name provided
		0	No name provided
		1	R. Zahensky
		0	No name provided
		0	No name provided
Form notes, " Sample 6PBFS-039-14 was reported at 337 g by the offsite lab and 377 g by the onsite lab. Sample 6PBFS-039-09 was not reported by the offsite lab."		0	No name provided

No name provided	1	Some samples counted years later, unclear if these were the original samples.
J. Rosenhagen	1	On-site lab counted samples over 4 days.
P. Vigil	0	
No name provided	0	
P. Vigil	0	
C. Fluty	1	Form notes, " Samples were counted on 03/14/2007 or 03/15/2007; five samples were re-analyzed in 2010 during lab method review by EPA and CDPH" and ". A combination of samples analyzed in March 2007 and reanalyzed samples from September 2010 were reported as the FSS survey results." Unclear why the original on-site lab results were replaced. May explain different populations, or not.
P. Vigil	1	Form notes, "Samples 6PBFS-039-10, -12, -13, -16, -17 through -19, and -22 through -26 were all analyzed more than 2 days after collection."

1	No static survey date and time, no sampler name.
1	No signature from RSO on gamma static or scan surveys.
1	Static surveyor name not provided in SUPR.
1	No static survey date and time, no sampler name.
1	Sampler/surveyor name not provided in SUPR.
1	Gamma static form undated.
1	No static survey date and time, no sampler name.

Single set of FSS_SYS samples suggests falsification less likely; work done in 2006.
Resample due to low Bi-214 FSS_SYS variability, evidence of multiple data sets.
Resample due to different weights for on-site/off-site lab samples, fact that samples were counted later than others, indications of different populations for Bi-214, K-40, and Ac-228.

TU040
TU041
TU042
TU043
TU044
TU045

2	1. Bi-214 and Ac-228 FSS_Bias have lower variability and means than other data - extreme difference for Bi-214. 2. Form notes, "Notes: Standard deviation is greater than the mean for TU040 (Bi-214). "	1. For Ac-228 and K-40, FSS_SYS and FSS_Bias have very different slopes, suggesting data came from very different populations. FSS_SYS has slope breaks indicating different populations in that set. 2. Form notes, "Final systematic samples display characteristics of at least two different data population for Bi-214 and Ac-228. "
0		Slope breaks on Ac-228, Bi-214,and K-40 graphs indicating different populations.
2	FSS_Bias have lower variability than FSS_SYS for Ac-228, Bi-214, K-40.	FSS_SYS and FSS_Bias have different slopes for Ac-228, Bi-214, and K-40 suggesting different populations between data sets.
2		FSS_Bias has slope breaks for Bi-214 and K-40 suggesting different populations.
2		K-40 has multiple slope breaks suggesting different populations. Bi-214 and Ac-228 may also have slope breaks, but more subtle.
2		1. For K-40 and to a lesser extent Ac-228 and Bi-214, FSS_SYS has different slope than other data sets, and slope breaks indicating different populations. Form notes, "The Ac-228 and K-40 results display characteristics of multiple data populations."

2	1. For gamma static form notes, "The static count range was 4,800 to 6,200 cpm. No signature from the site radiation safety officer (RSO) was recorded on this survey." 2. For gamma survey, form notes, "Scan range for the 2350-1 Instrument is 4,000 to 5,400 cpm. No signature from the site RSO was recorded on this survey. The scan data are not consistent with the static data or the FSS lab data." 3. Scan and static surveys have low range.
1	Form notes, "Static survey date and time not provided in SUPR."
5	Form notes, "Scan range for the 2350-1 Instrument is 3,800 – 5,400 cpm. The 3-sigma investigation level for the 2350-1 Instrument was 8,948 cpm. No signature from the site RSO was recorded on this survey." Also, no signature for gamma static survey.
2	Form notes, "Static survey date and time not provided in SUPR."
1	Form notes, "Date and time of static survey not provided in SUPR."
6	Form notes, " Static survey date and time not provided in SUPR. Gamma static dataset is consistent with gamma scan dataset and inconsistent (low variability) with FSS sample dataset."

Form notes, "Data is inconsistent for Ac-228, Bi-214, and K-40. The offsite lab results appear to be erratic."	Some samples 0 for Ac-228, Bi-214, K-40	0	No name provided
		1	R. Roberson
Form notes, " Data is inconsistent in comparison to Ac-228, K-40, and Bi-214."		1	R. Roberson
1. Form notes, "6PBFS-043-113 had an onsite lab mass of 334 grams and an offsite lab mass of 332 grams." 2. Form notes, "For sample 6PBFS-043-122, the difference between Ac-228 concentrations were significantly large between onsite (0.874 pCi/g) and offsite (0.0 pCi/g)."		1	R. Zahensky
		0	No name provided
		0	No name provided

C. Fluty	1	Form notes, "One FSS sample (040) were analyzed on 02/28/2007." This suggested
No name provided	0	
No name provided	1	FSS_SYS Samples counted on 4 days and not sequentially.
No name provided	1	1. FSS_samples were counted over 1 week, suggesting possible substitution. Form notes, "Samples were counted from 03/21/2007 through 03/28/2007." 2. Different weights (2 grams) between on-site and off-site lab.
C. Fluty	1	1. FSS_samples were counted over 6 days suggesting possible substitution. Form notes, "Samples were counted between 03/23/2007 and 03/28/2007." 2. Samples have different weights. Form notes, " 6PBFS-044-01 has an onsite lab mass of 357 grams and an offsite lab mass of 374 grams, 6PBFS-044-12 has an onsite lab mass of 318 grams and an offsite lab mass of 324 grams."
P. Vigil	1	1. Form notes, "FSS samples were counted within 2 days of collection. FSS-BIAS samples 6PBFS-045-001 and -035 were counted between 23 and 34 days after collection." Suggests possible substitution. 2. Low variability and inconsistent gamma static data.

1	No signature from RSO on gamma static or scan surveys.
1	No static survey date and time, no sampler name.
1	No signature from RSO on gamma static or scan surveys.
1	No static survey date and time, no sampler name.
1	No static survey date and time, no sampler name.
1	No sampler/surveyor name in SUPR

Resample due to different weights for on-site/off-site lab samples, indications of different populations for Bi-214, K-40, and Ac-228, and low variability and evidence of different populations for Bi-214, Ac-228, and K-40.
1. FSS_SYS Samples counted on 4 days, and not sequentially. Form notes: " • FSS sample (132) analyzed on 07/14/2007 • FSS samples (117, 121, 122, 126, 127, 129, 131, and 134) analyzed on 07/17/2007 • FSS samples (118, 133, 120, 124, 123, 125, 128, and 130) analyzed on 07/18/2007. • FSS sample (119) analyzed on 07/19/2007." 2. Resample due to samples being counted on 4 different days and not sequentially (suggests potential for sample substitution), FSS_Bias having lower variability than FSS_SYS for Ac-228, Bi-214, and K-40, and evidence of different populations between data sets on Q-Q plots.
Resample due to sample counting over 1 week (potential for substitution),different weights between on-site and off-site lab, large difference in 1 Ac-228 result, and evidence of different populations on Q-Q plots.
Resample due to FSS sample counting over 6 days (potential for substitution), significant differences between on-site and off-site sample weights (not clear the same samples were counted), and the evidence for multiple populations based on the K-40 Q-Q plot.
Resample due to multiple populations for Bi-214, Ac-228, and K-40 and counting 2 FSS_Bias samples much later (suggests substitution).

TU046
TU047
TU048
TU049
TU050
TU050A

2		1. K-40 has multiple slope breaks, suggesting different populations. Ac-228 may have slope breaks.
2	1. K-40 FSS_Bias has low variability (much lower than FSS_SYS). Mean is also lower than FSS_SYS.	1. K-40 data sets each have different slope and FSS_SYS has slope breaks, indicating different populations. Ac-228 and Bi-214 data sets also have different slopes and slope breaks, but less pronounced than K-40."
2		1. Ac-228 and K-40 have slope breaks indicating different populations. Bi-214 has low variability. 2. Form notes, " The graph for Bi-214 shows relatively low variability.
2	For Bi-214, Cs-137, and Ac-228, FSS_SYS has very low variability and a lower mean than other data sets. However, for K-40, FSS_Bias has very low variability.	1. Ac-228, Bi-214, and K-40 FSS_SYS has a different slope and slope breaks indicating multiple populations. Most pronounced in the case of K-40.
2	1. K-40, Cs-137 FSS_SYS have low variability.	1. FSS_Bias line has different slope for Ac-228 and Bi-214. 2. Form notes, "The quantile plots indicate multiple soil types were sampled."
2	1. K-40, Cs-137 FSS_Bias have low variability, for K-40 appears to be a different population	1. K-40 FSS_Bias samples line has a different slope than the other plotted data. 2. Form notes for Ac-228, "The quantile plot for Ac-228 indicates that multiple soil types may be present in the trench unit."

1	
3	
1	
5	1. Unusually low range for gamma statics. Form notes for statics, "The static data ranged from 4,200 to 5,200 cpm... There is hardly any essentially no overlap between the scan and the static data. The static data are not consistent with the FSS data. The range of the static measurements is approximately the range expected from statistical counting variability." 2. Form notes for gamma scan, " The scan range for the 2350-1 Instrument is 5,000– 7,000 cpm. The 3-sigma investigation level for 2350-1 Instrument was 8,975 cpm... The scan data are inconsistent with the static data and somewhat consistent with the FSS data."
13	1. For gamma static data, form notes, "Static survey date and time not provided in SUPR. Gamma static dataset inconsistent (low variability) with scan data and Final Systematic sample dataset with results between 3,998 and 4,855 cpm. Mean result of 4,201 ±211 cpm." 2. For gamma scan, form notes, "Gamma scan range is 4,350 – 14,200 cpm, with the investigation level at 7,100 cpm. Gamma scan dataset is not consistent with static data or Final Systematic sample dataset." 3. Form concludes that the "Final Systematic samples appear to have been properly collected in the areas of highest gamma scan and hot spots weren't avoided." However, without GPS data how can this be certain and why weren't there FSS_Bias samples at the hot spots?
7	1. For gamma static data, form notes, "Static survey date and time not provided in SUPR. Gamma static dataset inconsistent (low variability) with scan data and Final Systematic sample dataset with results between 3,903 and 4,310 cpm. Mean result of 4,074 ±115." 2. For gamma scan, form notes, "Gamma scan range is 3,840 – 12,580 cpm, with the investigation level at 7,100 cpm. Gamma scan dataset is not consistent with static data or Final Systematic sample dataset."

		0	No name provided
		0	No name provided
Form notes, "The Ac-228 data are not consistent. The offsite lab reported one Ac-228 result at zero."		0	No name provided
Form notes, "Data is inconsistent in comparison to Ac-228. Two FSS sample (310 and 314) results from the offsite lab were recorded at zero. The onsite lab data were approximately 1 pCi/g."		0	No name provided
1. Form notes, "Eight samples were counted by offsite labs for confirmation. Seven of the offsite results were above the minimum detectable activity for Ra-226. The RPDs for these samples ranged from 22 to 166, indicating that the onsite lab's results were biased high."	1. For Bi-214 Form notes, "Final Systematic samples #482, 483, 484, and 486 have abnormally low results." 2. For Ac-228, Form notes: "Several Bias and Characterization samples have results at or below 0. Final Systematic samples #483, 484, and 486 have abnormally low results."	0	Name not provided
1. RPD for 7 samples was 74.31. 2. Form considered consistent.		0	Name not provided

C. Fluty	1	1. Form notes, " None of the FSS samples (6PBFS-046-01 to -18) were analyzed within 2 working days." Also, "Sample -01 was counted on 04/10/2007," which is more than 2 weeks after collection. Possible indication of sample substitution.
C. Fluty	1	1. Form notes, "FSS samples 6PBFS-047-74 through -80, -82 through 90 were analyzed on 06/30/2007. FSS samples 6PBFS-047-81 and -91 were analyzed on 06/22/2007." Also, "FSS-Bias samples 6PBFS-047-25 through -43 were analyzed 24 days after collection. All other samples were counted within 2 weeks of sample collection." This suggests potential substitution.
P. Vigil	1	1. Form notes, "• One FSS sample (012) was analyzed on 05/07/2007. • One FSS sample (006) was analyzed on 05/11/2007. • One FSS sample (002) was analyzed on 05/15/2007. • One FSS sample (008) was analyzed on 09/09/2010. • One FSS sample (005) was analyzed on 09/10/2010. • One FSS sample (016) was analyzed on 09/05/2010. • FSS samples (001, 003, 004, 007, 009, 010, 011, 013, 014, 015, 017, and 018) were analyzed on 05/12/2007." 2. Even without the samples analyzed in 2010, the fact that samples were counted on different days suggests the potential for falsification.
P. Vigil	1	Unusually low range for gamma statics; gamma static survey is inconsistent with gamma scan and FSS data.
C Hughes	1	1. Form notes: "Gamma static dataset inconsistent (low variability) with scan data and Final Systematic sample dataset with results between 3,998 and 4,855 cpm." Also, "Gamma scan dataset is not consistent with static data or Final Systematic sample dataset." 2. Low variability for Bi-214, Ac-228, K-40 FSS_Bias samples
C Hughes	1	1. Gamma static dataset low variability and inconsistent with scan data and Final Systematic sample dataset with results between 3,903 and 4,310 cpm. Also, "Gamma scan dataset is not consistent with static data or Final Systematic sample dataset."

1	No sampler/surveyor name in SUPR
1	No static survey date and time, no sampler name.
1	No signature from RSO on gamma static or scan surveys.
1	No signature from RSO on gamma static or scan surveys.
1	SUPR did not have static survey date and time
1	SUPR did not have static survey date and time

Resample due to multiple populations for K-40 and possibly B-214 and because one FSS_Bias sample was counted on a completely different day than the others (which were not counted within 2 days of collection). These indicate possible sample substitution
Resample due to multiple populations for K-40 and probably for Ac-228 and Bi-214, and because 2 samples were analyzed on a different das, suggesting potential substitution. FSS_Bias samples, which Q-Q plots indicate are a different population were counted 24 days after collection.
Resample due to potential substitution - samples were counted over 12 days according to the form, but only one sample was analyzed on some days. Also, there is little variability for Bi-214 and evidence of multiple populations.
1. TU49 modified after 5 rounds of excavation and sampling to move contaminated area to TU 50. 2. Resample due to low variability gamma statics, which were inconsistent with FSS data, as well as low variability FSS_SYS data for Bi-214, Ac-228, Cs-137 and low variability FSS_Bias for K-40.
1. Resample due to low variability gamma static data set that was inconsistent with scan data and the FSS data set and inconsistency between gamma scan and FSS data set. Also, low variability of B-214, AC-228, K-40 FSS_Bias samples suggests these are not related to the gamma scan data.
1. Resample due to low variability gamma static data set that was inconsistent with scan data and the FSS data set and inconsistency between gamma scan and FSS data set. Also, there are multiple populations for K-40.

TU051
TU051A
TU052
TU053
TU054
TU055
TU056

2	1. For Ac-228 and Bi-214, FSS_SYS have low variability and appear to be a different population.	1. Ac-228 and Bi-214 FSS_SYS have lower slope suggesting different population.
2	1. FSS_Bias samples appear to be a different population (low variability) for Ac-228, Bi-214, and K-40. 2. Bi-214 FSS_SYS set has low variability and for K-40, FSS_SYS has higher mean and lower variability.	1. For Bi-214, FSS_SYS set has higher slope than all of the other sets. 2. Form notes, "The graph is more horizontal than expected (low variability) for Bi-214. Final systematic samples display characteristics of at least two data populations for K-40."
0	1. FSS_SYS for Bi-214 has somewhat lower variability than other data sets.	
2	1. FSS_Bias samples for Ac-228, Bi-214, and K-40 have low variability and higher means that the other sample sets; K-40 appears to be a different population. 2. FSS_SYS for Bi-214 have low variability.	1. FSS_Bias plot with lower slope for K-40, Bi-214, and Ac-228.
2	1. FSS_SYS for Bi-214 and K-40 have somewhat lower variability than other data sets.	1. K-40 characterization sample set has flatter slope.
2	1. FSS_SYS for Ac-228 and Bi-214 and FSS_Bias for Bi-214 and Cs-137 have low variability. 2. Form notes, "Sample distribution of final systematic is slightly less variable compared to Bias and characterization data population. "	1. For K-40, FSS_SYS and FSS_Bias appear to be different populations.
2	1. K-40 characterization samples have low variability and FSS_Bias samples have lower mean and variability than FSS_SYS samples. May indicate multiple sources.	1. For K-40, FSS_Sys and FSS_Bias appear to be different populations.

23	1. For gamma static data, form notes, "Static survey date and time not provided in SUPR. Gamma static data are consistent with scan data (both low variability) and inconsistent with FSS sample dataset." 2. For gamma scan, form notes, "Gamma scan data is consistent with static dataset and inconsistent (low variability) with FSS sample dataset."
9	1. For gamma static data, form notes, "Static survey date and time not provided in SUPR. Gamma static dataset inconsistent (low variability) with scan data and FSS sample dataset." 2. For gamma scan, for notes, "Gamma scan data is consistent with FSS sample dataset and inconsistent with static data. Scan range for the 2350-1 Instrument is 2,890 – 13,200 cpm, 3-sigma investigation level for the 2350-1 Instrument is 7,048 cpm."
2	1. Scan and static surveys consistent. Range of statics, 4,400 to 5,500 cpm.
4	
5	1. Scan and static data sets consistent, scan noted to be on the high side of the gamma scan range. Also consistent with FSS samples.
4	1. Static maximum (6,889 cpm) inconsistent with gamma scan maximum (14,620 cpm). No signature from RSO.
5	

1. Form notes, " Observations: Comparing biased, characterization, and final systematic samples (21 samples), the average Ra-226 result reported by the offsite lab is 38.8% of the result reported by the onsite lab. "		1	B Evans
1. Form notes, "Two FSS samples sent for offsite analysis. Ra-226 results are lower for offsite samples." Also, "Some offsite samples were counted approximately 1 year later."	1. Form notes for Bi-214, Ac-228, and K-40: "Final systematic samples indicate the potential for at least two data populations. Bias, characterization, and final systematic samples display different characteristics from other samples."	0	Name not provided
1. Form notes, "Data are inconsistent in comparison to Ac-228. The offsite lab reported two final systematic samples (051 and 065) at 0."		0	Name not provided
1. Form notes, "Data is inconsistent. Samples 117 and 120 Ac-228 concentrations were not detected at the offsite lab after yielding results above the detection limit for the onsite lab. "	1. Form notes for Ac-228, Bi-214, and K-40: " : Bias and characterization samples indicate the potential for at least two data populations."	0	Name not provided
1. 1 out of 7 off-site lab samples had inconsistent weight with the on-site lab samples		1	R. Roberson
1. Form notes that "Data comparison is relatively consistent for Ac-228, Bi-214, and K-40."		1	J. Cunningham
1. Form notes, "Data is inconsistent in comparison to Ac-228, K-40, and Bi-214. Two Ac-228 results were reported at zero by the offsite lab."		0	Name not provided

Name not provided	1	1. Gamma scan and gamma static data are inconsistent with each other and inconsistent with the FSS data. 2. Collection of FSS_SYS samples on two days may be indication of falsification, particularly since one sample, 336, was collected out of order on the 2nd day.
C Hughes	1	1. Gamma static and gamma scan data are consistent with each other, but inconsistent with the FSS_SYS data. 2. Collection of a single FSS_SYS sample 2 days after collection of the others.
C. Fluty	0	
P. Vigil	1	low variability of FSS_SYS and FSS_Bias for Bi-214, apparent different population for K-40 FSS_Bias, and inconsistent off-site lab results.
Name not provided	1	1. One sample sent to the off-site lab had a different weight than the sample counted by the off-site lab; suggests a different sample may have been sent.
Name not provided	1	Static max is less than 1/2 of the gamma scan max.
P. Vigil	0	

1	SUPR did not have static survey date and time
1	SUPR did not have static survey date and time
1	No signature from RSO for gamma survey and scans
0	
1	1. No date or time for gamma statics in SUPR.
1	1. No RSO signature for gamma scans or survey.
1	1. No RSO signature for gamma scans or survey.

1. After 23 rounds of excavation and sampling, the Ra-226 contaminated portion of the trench became a new trench unit, TU 051A, but it is unclear if all of the Ra-226 contamination was in the area that became TU 051A from the beginning. 2. Form notes about dates FSS_SYS samples were collected, "FSS samples 6PBFS-051-334, -335, -337 through -340, -345 through -351 were collected on 02/18/2008. Samples -336, -341 through -344 were collected on 02/19/2008." Although the Form concludes this is not evidence of falsification, it could be, particularly, since sample 336 was collected out of sequence. 3. Resample due to inconsistent gamma scan and gamma static data, low variability gamma static data, evidence that there are different populations (low variability Ac-228 and Bi-214 FSS_SYS), and potential falsification associated with sampling over multiple days.
1. This TU was split from TU 051 after it underwent 23 rounds of excavation and sampling; 9 more round of excavation and sampling conducted on TU 051A (for a total of 32). 2. One FSS_SYS sample collected 2 days after the others. 3. Resample due to inconsistent gamma scan/static data with FSS data set, low variability Bi-214, Ac-228, and K-40 FSS samples, and collection of one FSS_SYS sample 2 days after collection of the others - possible substitution.
1. Appears off-site lab had trouble with Ac-228 analysis.
1. Resample due to low variability of FSS_SYS and FSS_Bias for Bi-214, apparent different population for K-40 FSS_Bias, and inconsistent off-site lab results.
1. 1 out of 7 off-site lab samples had inconsistent weight with the on-site lab samples, which may be an indication of falsification. 2. Resample due to inconsistent weight of one off-site lab sample, low variability FSS_SYS for Bi-214 and K-40, apparent different population of K-40 characterization samples.
1. Resample due to low variability of FSS_SYS for Ac-228 and Bi-214 and FSS_Bias for Bi-214 and Cs-137 and inconsistent gamma statics.
1. Resample due to low variability and inconsistent K-40 samples, inconsistent off-site lab results.

	EPA Statistician performed more detailed statistical analysis included separately

TU058
TU060
TU061
TU062
TU063
TU064

2	1. FSS_SYS and FSS_Bias for Bi-214 have low variability.	1. Appears to be 2 populations for K-40 FSS_SYS
2	1. FSS_SYS for Bi-214 has very low variability.	
2	1. FSS_Bias samples for Bi-214 and K-40 have lower variability than FSS_SYS samples.	1. K-40 FSS_SYS and FSS_Bias have different slopes, FSS_SYS has multiple populations. 2. Form notes, "K-40 FSS: Bimodal distribution indicated."
0		1. K-40 FSS_SYS (no bias samples) has slope breaks indicating multiple populations.
0	1. FSS_Bias samples have lower variability than FSS_SYS samples for Ac-228, Bi-214, while the opposite is true for K-40 and Cs-137.	1. Slope breaks in FSS_SYS for Ac-228, Bi-214, K-40, indicating multiple populations.
0	1. FSS_SYS samples have lower variability than other sets for Ac-228, Bi-214, K-40, and Cs-137	1. FSS_SYS set has flatter slope for K-40 and Ac-228.

2	1. Form notes, "The scan data is consistent with the gamma static dataset. The gamma scan and static data do not reflect the range of results from the laboratory data."
3	1. Gamma static max about 650 cpm lower than gamma scan max.
1	1. Gamma static max is about 1000 cpm lower than gamma scan max.
1	
1	1. Gamma static (4655 - 6034 cpm) and Gamma survey (4700 to 6100 cpm) ranges are unusually consistent
2	1. Gamma static max about 600 cpm lower than gamma survey max.

1. Form notes, "Data is inconsistent in comparison to Ac-228, Bi-214 and K-40. Two FSS samples (57 and 63) have results at 0 based on the offsite data."		0	Name not provided
1. Form notes, "The sample mass was inconsistent for sample 092. The onsite lab reported 366 grams while the offsite lab reported 296 grams." 2. FSS Samples counted by off-site lab over a year later. 3. Form notes, "Data is inconsistent in comparison to Ac-228. Two FSS samples (092 and 109) have results at zero based on the offsite data. The offsite data Vs onsite data is inconsistent in comparison to Ac-228 and K-40."		1	R. Roberson
	Form notes, "Biased samples were all taken 'along the trench bottom.' The FSS samples, taken over the entire SU, show a broader range of activity, as expected. K-40 activity in the trench bottom was unusually homogeneous."	1	R. Zahensky
		1	J. Taylor
		1	J. Taylor
1. Form notes, "Data is inconsistent in comparison to Ac-228 and K-40. Two final systematic samples (064 and 069) have results at zero based on the offsite data. Two final systematic samples (064 and 069) have low K-40 activity based on the offsite data."		0	Name not provided

P. Vigil	1	1. Gamma scan and gamma static data are inconsistent with the FSS laboratory data.
Name not provided	1	1. On- and off-site weights for sample 92 were different, suggesting possible sample substitution. 2. Form notes inconsistent results between off-site and on-site lab for multiple radionuclides.
Name not provided	1	1. FSS_SYS Samples collected over two days. K-40 has much higher variability and Cs-137 has a much lower variability for samples collected the second day, suggesting different population. Bi-214 samples collected the first day have a lower mean and lower variability than those collected the second day.
Name not provided	0	
Name not provided		
C. Fluty		

1	1. No RSO signature for gamma scans or survey.
1	1. No RSO signature for gamma scans or survey.
1	No reviewer or report data for gamma statics.
1	No reviewer or report data for gamma statics.
1	1. No RSO signature for gamma scans or survey.

1. Resample due to gamma scan and static data inconsistency with FSS lab data, multiple populations for K-40, and low variability Bi-214 FSS data.
1. Resample due to different weights for on- and off-site lab and counting of samples at off-site lab over a year later, suggesting possible sample substitution; inconsistent results between off-site and on-site lab; and low variability in Bi-214 FSS_SYS data set.
1. Resample due to uncertainty. FSS_SYS samples collected on two days but show significantly different results, suggesting different populations. FSS_Bias samples for K-40 and Bi-214 have lower variability than FSS_SYS. Also, gamma static max is a bit low.
1. Multiple populations do not necessarily indicate falsification.
1. DON had one sample recounted as part of a quality review.

	EPA Statistician performed more detailed statistical analysis included separately

TU065
TU125
TU126
TU127
TU128
TU131

2	1. FSS_SYS Bi-214 samples have low variability	1. Multiple populations of Ac-228 and Bi-214
2	1. FSS_SYS and FSS_Bias have low variability for Ac-228 and Bi-214. FSS_SYS have low variability for K-40, but FSS_Bias have higher mean and variability. FSS_Bias have low variability for Cs-137.	1. K-40 FSS_Bias appear to be a different population. There is a slope break (2 populations) in the FSS_SYS for K-40.
2	1. FSS_SYS and FSS_Bias have very low variability for Ac-228 and Bi-214. FSS_SYS has low variability for K-40 and FSS_Bias has very low variability for Cs-137. Mean of K-40 FSS_Bias samples is higher than for other sets.	1. K-40 FSS_SYS and FSS_Bias have different slopes, and slope breaks indicative of multiple populations. Appears to indicate that samples could be from different locations, possibly not associated with TU 126.
2	1. No FSS_Bias samples, even though there were gamma static and gamma scan exceedences.	1. Slope breaks in FSS_SYS for Ac-228, Bi-214, K-40, indicating multiple populations.
2	1. Characterization samples appear to be a different population for Bi-214 and K-40 due to very low variability, possibly Ac-228 due to lower mean and data range.	1. FSS_SYS and SYS_1 appear to have different sources due to different slopes, slope breaks, and data ranges for K-40 and Ac-228.
2	1. FSS_Bias has low variability for Ac-228, Bi-214, and K-40; K-40 also has lower mean than FSS_SYS. FSS_SYS has low variability for Bi-214. These observations suggest different sources/populations.	1. FSS_SYS and FSS_Bias have different slopes for K-40 and there is a slope break in the FSS_SYS data.

1	1. Form notes about gamma statics: "Static survey date and time not provided in SUPR. Gamma static dataset reported low variability and the range of results was inconsistent with the gamma scan dataset." 2. Form notes about gamma scan: "Gamma scan dataset reported a range of results between 3,200 cpm and 5,400 cpm with an investigation level of 9,321 cpm, and was inconsistent with the gamma static dataset."
5	1. No date or time recorded for the static survey in SUPR. 2. Form notes for gamma scan, "Scan survey performed on 04/09/09 at 11:20 after the first final systematic sample was collected." However, the gamma scan should have been performed first, followed by the gamma statics.
4	1. Gamma static (3715-7401 cpm) and gamma scan (3,700 to 7,400 cpm) ranges were unusually consistent (nearly identical). This consistency is suspect.
2	1. Form notes about gamma statics, "Gamma static counts ranged between 6,758 and 11,311 cpm; four counts exceeded the IL of 9,160 cpm. The range of gamma static counts is consistent with the gamma scan range and the FSS dataset. No reviewer or review data listed." 2. Form notes about gamma scan, "The gamma scan range was reported between 6,250 and 11,800 cpm, which is consistent with the range of gamma static counts and the FSS dataset. No further explanation is given for additional actions taken as a result of exceeding the IL of 9,160 cpm. These results are unusual in that the scan range and the static range are nearly identical."
3	1. Form notes about gamma statics, "No date or time recorded for static survey in SUPR. Gamma static dataset consistent with scan data (on the higher end of the scan range) and FSS dataset." 2. Form notes about Gamma scan, "Gamma scan exceeded the scan threshold, but SUPR doesn't reference the count rate exceedances."
2	1. Form notes about gamma statics, "Static survey date and time not provided in SUPR. Gamma static measurements ranged between 2,452 and 6,581 cpm and are consistent with the reported gamma scan range and FSS dataset." 2. Form notes about gamma scan, "The scan survey was performed on 05/08/09 at 12:25; however, this date may be a reporting error since it is more likely the survey date would have been 05/28/09. Gamma scan range listed as 2,020 to 7,020 cpm – less than the IL of 9,160 cpm. Gamma scan range is consistent with the gamma static measurements range and FSS dataset."

1. Form notes, "Two samples were sent to the offsite lab for analysis, and one of these samples was sent to two different offsite labs for analysis. The Ac-228 results reported by the onsite lab were not consistent with the results reported by the first offsite lab, but the onsite lab results were consistent with the second offsite lab for Ac 228 and all other nuclides."		1	R. Roberson
1. RPD 53.28 to 125.37 for Ra-226.	1. One bias sample below zero for Bi-214.	1	R. Zahensky
		1	T. Rolfe
1. Form notes, "Onsite / offsite data compared satisfactorily within one order of magnitude (a factor of 10)." Language suggests that there could have been large differences.		1	A. Smith
1. RPD 25.05 5o 114.16		1	R. Zahensky
1. Form notes, "Onsite / offsite data compared satisfactorily within one order of magnitude (a factor of 10)." Language suggests that there could have been large differences.		1	R. Zahensky

Name not provided	1	1. Gamma scan and gamma statics were inconsistent with each other. Gamma statics had low variability.
Name not provided	1	1. Gamma scan conducted after or during collection of FSS_SYS samples.
Name not provided	1	1. Nearly identical gamma scan and gamma static data ranges. 2. K-40 data appear to indicate different sources for FSS_SYS and FSS_Bias samples.
Name not provided	1	1. Unusually consistent gamma scan and gamma static data ranges. 2. Possible factor of 8 or 9 difference between on-site and off-site lab results. 3. No FSS_Bias samples even though there were exceedences in the gamma scan and gamma static data.
Name not provided	1	1. Samples appear to be from different sources (data sets have different slopes and slope breaks)
Name not provided	1	1. Possible failure to collect gamma scan after final excavation and before FSS_SYS samples were collected. 2. Possible factor of 8 or 9 difference between on-site and off-site lab results. 3. Data indicate different sources (populations) for Bi-214, K-40 and Ac-228.

1	SUPR did not have static survey date and time
1	SUPR did not have static survey date and time
1	No reviewer or review date for gamma statics.
1	No reviewer or review date for gamma statics.
1	SUPR did not have static survey date and time
1	1. SUPR did not have static survey date and time. 2. Gamma scan may not have been conducted after final excavation.

1. Resample due to inconsistent gamma scan and gamma statics, low variability Bi-214 FSS_SYS.
1. Resample due to apparent different populations of K-40 between FSS_SYS and FSS_Bias, low variability of Ac-228 and Bi-214 FSS_SYS and FSS_Bias.
1. Multiple flags for K-S test (compared to results from B and D-2). Ac-228 mean 7th lowest. K-40 mean 7th highest. Bi-212 mean is 7th lowest. Pb-212 is 12th lowest. 2. Resample due to unusually consistent gamma static and gamma scan data, low variability FSS_SYS and FSS_Bias for Ac-228 and Bi-214 and K-40 FSS_SYS, and the potential that the K-40 sample indicate different sources.
1. Resample due to unusually consistent gamma scan and gamma static data ranges, failure to collect bias samples when there were gamma scan and gamma static exceedences, multiple populations in FSS_SYS data for Ac-228, Bi-214, K-40.
1. Resample due to different sample sources, based on K-40 and Ac-228 Q-Q plots.
1. Resample due to different sources as indicated by the Bi-214, K-40, and Ac-228 data, possible large differences between on- and off-site lab data, and potential failure to collect gamma scan data after final excavation.

	EPA Statistician performed more detailed statistical analysis included separately

TU186

2	1. FSS_Bias has low variability for Ac-228 and Bi-214 and characterization samples had low variability for B-214 and K-40.	1. FSS_SYS, FSS_Bias, characterization, and SYS_1 all have different slopes for K-40. There are slope breaks in the FSS_SYS data set indicating multiple populations.

3	

		0	Name not provided

J. Walther	1	1. Four samples analyzed by on-site lab 8 days after the other 14 samples were analyzed, which could indicate sample substitution. 2. Different slopes for each K-40 data set indicates different populations, suggesting different sample sources.

1	No sampler name.

1. Form notes about sample analysis, "Samples 55-58, 60, 62-64, 66, and 68-72 were analyzed on 11/10/10. Samples 59, 61, 65, and 67 were analyzed on 11/18/2010." This is suspicious - there may have been sample substitution for the 4 samples analyzed more than a week later.
2. Resample due to potential sample substitution of 4 samples in FSS_SYS set and probable different sample source for FSS_SYS, FSS_Bias, SYS_1, and characterization samples based on K-40 Q-Q plots.

	EPA Statistician performed more detailed statistical analysis included separately

Summary of EPA review of Parcel B Trench U

Number of TU's	**% of Parcel B total**
70	100%
Navy reviewed 70 total Trench Units to look fc	
2	3%
2	3%
66	94%
EPA reviewed the 66 Trench Units recommenc	
15	21%
0	0%
51	73%
0	0%
Total Navy and EPA recommend for resamplir	
53	76%

Trench Unit	Overall score (0,1, or 2)
TU015	0
TU022	0
TU025	0
TU026	0
TU027	0
TU028	0
TU029	0
TU030	0
TU033	0
TU036	0
TU041	0
TU052	0
TU062	0
TU063	0
TU064	0
TU001	2
TU002	2
TU003	2
TU004	2
TU005	2
TU006	2
TU007	2
TU008	2
TU009	2
TU010	2
TU011	2
TU012	2
TU013	2
TU014	2
TU016	2

nits

Total trench units in Parcel B
or signs of potential falsification
Navy recommended confirmation sampling due to signs of potential falsification
Navy recommended reanalysis of archived samples
Navy recommended NFA = No further action due to signs of falsification, but potential further action due to uncertainty
led for NFA
EPA score 0 = No specific findings of particular concern
EPA Score 1 = Need further review
EPA Score 2 = Need resampling before determination that the record supports ROD requirements met
Not yet reviewed
ng

TU017	2
TU018	2
TU019	2
TU020	2
TU021	2
TU023	2
TU024	2
TU037	2
TU039	2
TU040	2
TU042	2
TU043	2
TU044	2
TU045	2
TU046	2
TU047	2
TU048	2
TU049	2
TU050	2
TU050A	2
TU051	2
TU051A	2
TU053	2
TU054	2
TU055	2
TU056	2
TU058	2
TU060	2
TU061	2
TU065	2
TU125	2
TU126	2
TU127	2
TU128	2
TU131	2
TU186	2

EPA, CDPH, and DTSC review of Parcel B Rad Data Evaluation

	Trench	Fill	Building Sites	Total	% of total
Tota Survey Units in Parcel B	70	112	17	199	100%
Navy recommended resampling	2	18	9	29	15%
Navy recommended reanalyzing archived samples	2	1	0	3	2%
EPA, CDPH, DTSC recommend resampling	55	89	7	151	76%
Total recommended resampling	57	107	16	180	90%
No signs of falsification found in data	13	5	1	19	10%
Regulators not yet reviewed	0	0	0	0	0%
% of total recommended resampling	81%	96%	94%	90%	

The above was for Parcel B alone. Below is for entire Shipyard.

Total Survey Units in Hunters Pt Tetra Tech EC	*305*	*514*	*
Parcel B as % of total	23%	22%	*

* Parcel B has 7 former building sites, which is 21% of the total 34. The above chart shows sur
The number of survey units at building sites for the entire site was not available.

Parcel B Examples of issues and their prevalence

Trench Unit	No gamma static and scan	Weight difference	>=2 results Zero or negative			
Total	16	5	30	0	0	0
% of total	24%	8%	45%	0%	0%	0%
TU001	1		1			
TU002	1		1			
TU003	1		1			
TU004	1		1			
TU005	1					
TU006	1		1			
TU007	1	1	1			
TU008	1					
TU009	1					
TU010						
TU011	1					
TU012	1		1			
TU013	1		1			
TU014	1					
TU015						
TU016	1					
TU017						
TU018			1			
TU019	1	1	1			
TU020	1		1			
TU021			1			
TU022			1			
TU023			1			
TU024			1			
TU025						
TU026						
TU027						
TU028			1			
TU029						
TU030						
TU033						
TU036			1			
TU037						
TU039			1			
TU040		1	1			
TU041						
TU042			1			
TU043						
TU044		1				
TU045			1			

TU046						
TU047						
TU048						
TU049			1			
TU050						
TU050A						
TU051						
TU051A						
TU052						
TU053			1			
TU054			1			
TU055						
TU056			1			
TU058			1			
TU060		1	1			
TU061			1			
TU062						
TU062						
TU063						
TU064			1			
TU065						
TU125			1			
TU126						
TU127						
TU128						
TU59		1				

EPA and CDPH review of the 10 fill units that did not receive soil from trench units that were recommended for
Fill Unit
OB098
OB117
OB147
OB185
OB240

resampling		
Overall score (0,1, or 2)	**Reviewer**	**Box Plots**
2	NB, TJ, KB	Cs-137 - several low/negative results - indicating a data quality issue; Bi-214 low variability
2	NB, TJ, KB	Cs-137 - several low/negative results - indicating a data quality issue AC-228 and Bi-214 range indicates low variability
2	NB, TJ, KB	Cs-137 - several low/negative results - indicating a data quality issue, and range indicates possible low variability; Bi-214 range very low variability. Form notes, "Low variance in all three nuclides plotted. High outlier for Bi-214."
2	NB, TJ, KB	Cs-137 - several low/negative results - indicating a data quality issue. Low variability Bi-214. Form notes, "K-40 and Bi-214 results have low variance. High outlier for Bi-214."
0	NB, TJ, KB	Cs-137 - several low/negative results - indicating a data quality issue; Bi-214 low variability, which was noted on the form.

Q-Q Plots	**Rounds of excavation**
K-40 results indicate possible multiple populations, Ac -228 and Bi-214 may also have multiple populations	1
K-40 results indicate possible multiple populations, Ac -228 and Bi-214 may also have multiple populations	1
K-40 results indicate possible multiple populations, Ac -228 and Bi-214 may also have multiple populations	1
Ac-228 results indicate possible at least two populations. Also K-40 and Bi-214 have slope breaks indicating multiple populations. Form notes, "K-40 and Bi-214 have more horizontal than expected graphs (low variance). Ac-228 results display characteristics of at least two different data populations."	1
K-40 has slope breaks indicating multiple populations. Form notes, ": Bi-214 plot is near horizontal, indicating low variability in the results."	1

Gamma scan or static concerns	**On vs offsite lab**
1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR	2 FSS results from off-site lab at 0
1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR 3) Timining of scan measurements not every 6 seconds as required in work plan, most 10 seconds, some 30 seconds apart. 4) More scan data collected than expected based on volume of soil.	3 samples differ, 2 Bl--214 greater than off-site lab and 1 Ra-226 less than off-site lab
1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR 3) Several 20 minute time gaps occurred. 4) Twice as many scan meaurements reported. 5) Form notes, " . Approximately 700 scan measurements were reported for OB147 (10 pages with approximately 66 results per page), which is twice as many results as generally reported for a complete fill unit. The extra data could result from the inconsistent timing of the individual measurements and multiple gaps in data, indicating potential instrument problems."	On-site lab - K-40 over estimated on two samples by 40-50%. Form notes, "Inconsistent onsite lab results, no offsite lab analysis"
1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR 3) Scans not conducted in 6-second intervals, several time gaps, gamma scan data collected prior to sample collection, more than twice as many scan measurements reported than required for this small fill unit	1) On-site lab - K-40 over estimated on two samples by 50-60% 2) Inconsistent onsite lab results
1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR	1) On-site lab - K-40 over estimated on two samples by 50%

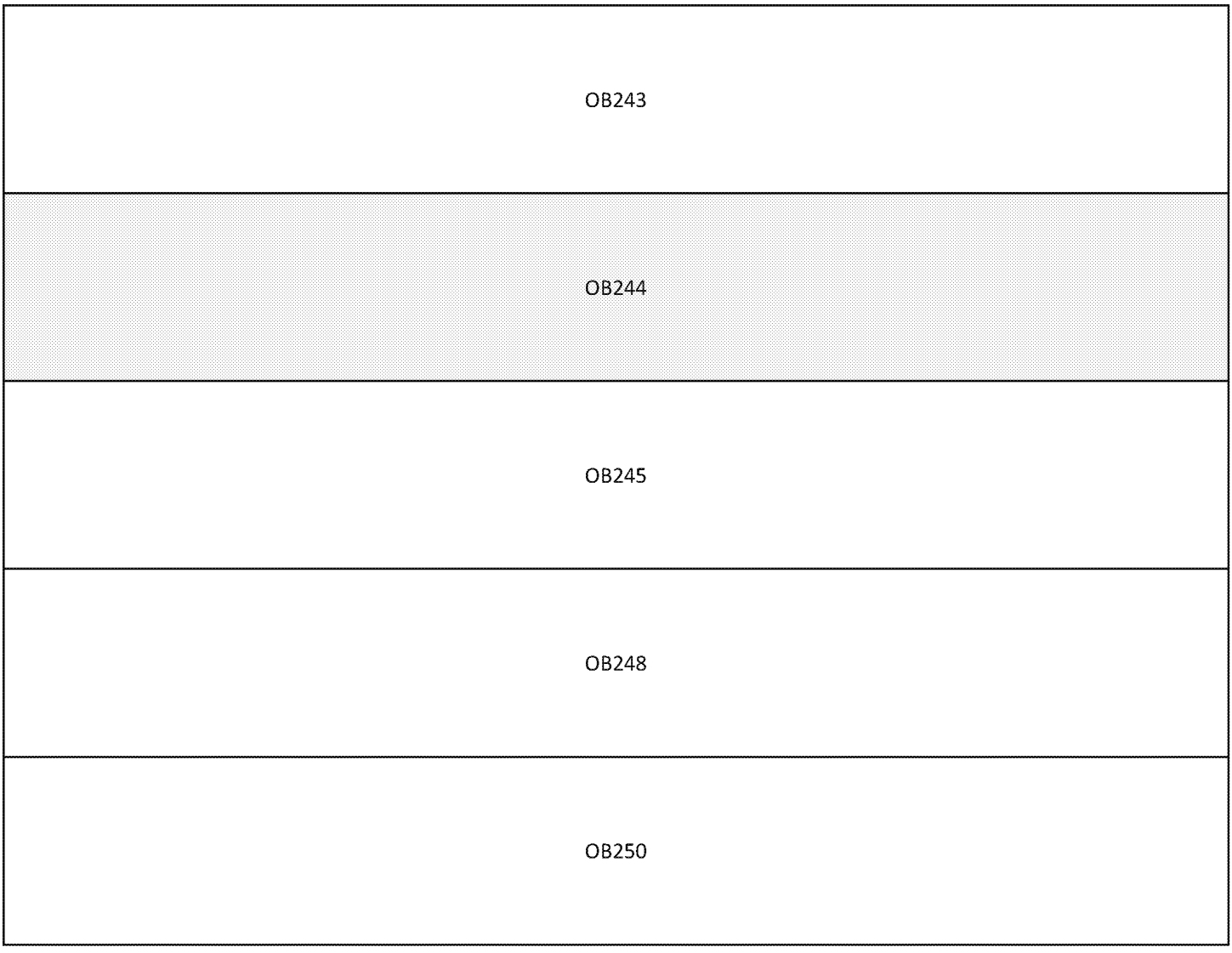
Time Series	**Suspect name (1=yes, 0=no)**	**Name, if suspect**	**Name, if not suspect**	**Signs of falsifying (1=Yes, 0=no)**
None		Name(s) not provided	Name(s) not provided	1
1 FSS Ac-228 result at or below below 0.		Name(s) not provided	Name(s) not provided	1
2 FSS Ac-228 results at or below 0.		Name(s) not provided	Name(s) not provided	1
2 FSS Ac-228 results at or below 0.		Name(s) not provided	Name(s) not provided	1
2 FSS Ac-228 results at or below 0.		Name(s) not provided	Name(s) not provided	1

Signs of falsification summary	**Failure to follow workplan (1=Y, 0=N)**
1) Gamma static data not provided in SUPR 2) Names of samplers/surveyors not provided in the SUPR 3) Name of scan/static surveyor not provided in the SUPR 4) Q Q Plots for FSS results for K-40 depict at leat two different data populations	1
1) Gamma static data not provided in SUPR 2) Names of samplers/surveyors not provided in the SUPR 3) Name of scan/static surveyor not provided in the SUPR 4) Too much gamma scan data, but was collected every 10-30 seconds. This is very inconsistent	1
1) Gamma static data not provided in SUPR 2) Names of samplers/surveyors not provided in the SUPR 3) Name of scan/static surveyor not provided in the SUPR	1
2) Investigative data, and scan and static data not provided in RACR or SUPR 3) Names of samplers/surveyors not provided in the SUPR 4) Q Q Plots for FSS results depict at leat two different data populations for Ac-228.	1
1) Gamma static data not provided in SUPR 2) Names of samplers/surveyors not provided in the SUPR 3) Name of scan/static surveyor not provided in the SUPR	1

Signs of failure to follow workplan
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR

Comments - Other
2 FSS results from off-site lab at 0
Inconsistent gamma scan data - too much for size of unit, and collected every 10-30 seconds is a significant discrepancy.
1) Inconsistent on site lab results 2) Navy reviewer indicates all three nuclides results indicate low variance/variability; however, results are similar to other NFA fill units.
1) Inconsistent on site lab results
Navy reviewer indicates Bi-214 results indicate low variability; however, results are similar to other NFA fill units.

CDPH Recommendation
Resample: Due to FSS sample (001) analyzed on 09/20/2010, four years after the sample was collected. FSS samples (002 through 018) were analyzed on 10/04/2006. FSS sample (007) was analyzed by an offsite laboratory (Test/ America) on 01/21/2010. Two FSS samples (007 and 016) were counted by an offsite laboratory (Eberline) and the analysis date was not reported. (KB notes - analysis in 2010 was at the request of CDPH/EPA and does not indicate falsification)
NFA- not in indication of falsification but a data quality issue KB: Inconsistent gamma scan data suggests potential that the unit was not surveyed as required in the work plan. Should resample.
NFA- not in indication of falsification but a data quality issue KB: Multiple data quality issues, including gamma scan, on-site lab data. Very low variability Bi-214, Ac-228, etc. Should resample.
NFA- not in indication of falsification but a data quality issue KB: Resample due to low variability Bi-214, gamma scan data quality,
NFA- not in indication of falsification but a data quality issue


OB243
OB244
OB245
OB248
OB250

0	NB, TJ, KB	Cs-137 - several low/negative results - indicating a data quality issue; Bi-214, K-40 low variability
0	NB, TJ, KB	Cs-137 results all low, with multiple negative results - indicating a data quality issue; K-40 and Bi-214 data have low variability. Form notes, "All three nuclides show an unusually small sample variance for all three sampling events."
0	NB, TJ, KB	Cs-137 - several low/negative results - indicating a data quality issue and range indicates low variability. Bi-214 and K-40 have low variability. K-40 results have a higher mean and a lower variability compared to the rest of Parcel B
0	NB, TJ, KB	1) Cs-137 - several low/negative results - indicating a data quality issue 2) Bi-214 and K-40 results have unusually small variance
2	NB, TJ, KB	1) Cs-137 - several low/negative results - indicating a data quality issue and range indicates low variability 2) Bi-214 and K-40 have unusually small variance of FSS samples (low variability)

K-40 FSS has a different slope than other radionulides FSS (includes negative values); has slope breaks indicating multiple populations Large range of K-40 results	1
Bi-214 and K-40 results indicate low variability; K-40 FSS_SYS has slope breaks indicating multiple populations. Form notes, "Bi-214 and K-40 have graphs that are more horizontal than expected. (low variability)."	3
1) Bi-214 and K-40 results indicate low variability 2) Ac-228, Bi-214, and K-40 have slope breaks indiating multiple populations	1
Ac-228, Bi-214, and K-40 displays characteristics (slope breaks) of at least two sample populations	1
1) Bi-214 results indicate low variability 2) K-40 data has slope breaks indicating multiple populations	1

1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR	On-site lab - K-40 over estimated on two samples by 50-60%
1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR 3) Scans not conducted in 6-second intervals, most 7-seconds and many as high as 30 seconds apart. 4) 1 hour break in gamma scan data	1) On-site lab - K-40 over estimated on two samples by 35-45%
1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR 3) Scans not conducted in 6-second intervals, most 7-seconds and many as high as 30 seconds apart.	On-site lab - K-40 over estimated on two samples by 40%
1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR 3) Scans not conducted in 6-second intervals, most 7-seconds and many as high as 30 seconds apart.	On-site lab - K-40 over estimated on two samples by 50-60%
1) Gamma static and scan results were not provided in the SUPR 2) Names of samplers/surveyors not provided in SUPR 3) Scans not conducted in 6-second intervals 4) twice as many scan measurements collected as required	K-40 results don't align

Several sample AC-228 sample results approaching 0 with one result less than 0.		Name(s) not provided	Name(s) not provided	1
One AC-228 result less than 0		Name(s) not provided	Name(s) not provided	1
None		Name(s) not provided	Name(s) not provided	1
Several sample AC-228 sample results near or below 0.		Name(s) not provided	Name(s) not provided	1
1) Two AC-228 results near 0, including 1 below 0 2) Form notes for K-40, " Low sample variability as compared to other systematic sample K-40 results."		Name(s) not provided	Name(s) not provided	1

1) Gamma static data not provided in SUPR 2) Names of samplers/surveyors not provided in the SUPR 3) Name of scan/static surveyor not provided in the SUPR	1
1) Gamma static data not provided in SUPR 2) Names of samplers/surveyors not provided in the SUPR 3) Name of scan/static surveyor not provided in the SUPR	1
1) Gamma static data not provided in SUPR 2) Names of samplers/surveyors not provided in the SUPR 3) Name of scan/static surveyor not provided in the SUPR	1
1) Gamma static data not provided in SUPR 2) Names of samplers/surveyors not provided in the SUPR 3) Name of scan/static surveyor not provided in the SUPR	1
1) Gamma static data not provided in SUPR 2) Names of samplers/surveyors not provided in the SUPR 3) Name of scan/static surveyor not provided in the SUPR	1

1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
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1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR

Navy reviewer indicates Bi-214 and K-40 results indicate low variability; however, results are similar to other NFA fill units.
Navy reviewer indicates all three nuclides results indicate an unusually small sample variance; Also, Bi-224 & K-40 Q-plot indicates low variability; however, results are similar to other NFA fill units.
Navy reviewer indicates Bi-214 an K-40 results indicatelow variance; Also, Bi-224 and K-40 Q-plot indicates low variability; however, results are similar to other NFA fill units.
Navy reviewer indicates Bi-214 an K-40 results indicatelow variance; Also, Bi-224 and K-40 Q-plot indicates low variability; however, results are similar to other NFA fill units. Navy reviewer states Ac-228 results indicate at least two sample populations; however, other similar Q-Plots were not identified as such. Also K-40 results have higher mean and a lower variability compared to the rest of Parcel B.
Navy reviewer indicates Bi-214 an K-40 results indicatelow variance; Also, Bi-224 and K-40 Q-plot indicates low variability; however, results are similar to other NFA fill units.

NFA- not in indication of falsification but a data quality issue
NFA- not in indication of falsification but a data quality issue
NFA- not in indication of falsification but a data quality issue
NFA- not in indication of falsification but a data quality issue
NFA- not in indication of falsification but a data quality issue KB: Resample due to low variability Bi-214, multiple populations in K-40 dataset and gamma scan inconsistencies (twice as many measurements as expected with 7 to 30 seconds between measurements instead of 6 seconds)

Cell: G4
Comment: Jue, Tracy (CDPH-DDWEM):
Scans were provided
OB098 was scan surveyed with the towed array on 10/03/2006. The gamma scans for this overburden unit did not identify any measurements above the investigation level. Therefore, no additional samples were collected for this overburden unit.

Cell: P4
Comment: Jue, Tracy (CDPH-DDWEM):
The navy conducted navy scan OB098 was scan surveyed with the towed array on 10/03/2006. The gamma scans for this overburden unit did not identify any measurements above the investigation level. Therefore, no additional samples were collected for this overburden unit.

Cell: G5
Comment: Jue, Tracy (CDPH-DDWEM):
Gamma scans performed 10/16/2006 at 13:15.

Cell: G6
Comment: Jue, Tracy (CDPH-DDWEM):
Gamma scans data collected 1/8/2007 between 8:14 and 11:33

Cell: N6
Comment: Jue, Tracy (CDPH-DDWEM):

Cell: G7
Comment: Jue, Tracy (CDPH-DDWEM):
Gamma scan performed on 03/13/2007 from 08:00 to 12:58. There were several time gaps in the survey data, and the results are not provided in 6-second intervals as indicated in the SUPR. No scan results exceeded the investigation levels. Gamma scan data was collected prior to sample collection. Approximately 650 scan measurements were reported for OB185, which is approximately twice the amount of data generally collected for complete fill units, and OB185 was half the size of most fill units

Cell: N7
Comment: Jue, Tracy (CDPH-DDWEM):

DTSC review of fill units and associated trench units

This spreadsheet shows which fill units contain soil received from trench units that were recommended for resampling b
Note that many fill units received fill from multiple trench unit sources

Parcel B FUs (NFA and Navy recommended for Resample
OB045
OB013
OB024
OB015
OB016
OB004
OB054
OB056
OB065
OB050
OB053
OB060
OB069
OB055
OB043
OB044
OB087
OB075
OB076
OB079
OB080
OB041
OB074
OB083
OB086
OB088
OB090
OB091
OB001
OB066
OB071
OB072
OB082
OB095
OB100
OB102
OB108
OB109
OB111

y the Navy and/or regulatory agencies

Associated Trench Unit	Navy Recommends confirmation sampling of the FU	Navy Recommends TU Confirmation Sampling (2=yes)	Reg Agencies Recommend TU Confirmation Sampling
TU004			2
TU005			2
TU007			2
TU010			2
TU010			2
TU011			2
TU011			2
TU011			2
TU011			2
TU012			2
TU012			2
TU012			2
TU012			2
TU013	2		2
TU014			2
TU014			2
TU014			2
TU019			2
TU019			2
TU019			2
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TU020			2
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TU021			2
TU021			2
TU021			2
TU021	2		2
TU021			2
TU021			2
TU023			2
TU023	2		2
TU023			2
TU023			2
TU023			2

Confirmationa Sampling Recommended (2=yes; 0=no)	Navy recommends resampling FU that went into this TU, therefore, all FUs that went into this TU must be resampled. (OB072, OB196)
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OB110
OB113
OB114
OB117
OB133
OB134
OB138
OB140
OB142
OB145
OB146
OB148
OB149
OB150
OB157
OB160
OB161
OB169
OB178
OB186
OB188
OB194
OB195
OB200
OB193
OB198
OB211
OB196
OB202
OB143
OB190
OB249
OB208
OB218
OB049
OB104
OB204
OB209
OB212
ES170
ES173
OB035
OB177
OB206
OB219
OB222
OB223

TU026			0
TU026			0
TU026	2		0
TU027			0
TU033			0
TU033			0
TU033	2		0
TU033	2		0
TU036			0
TU036	2		0
TU036			0
TU039	2		2
TU039			2
TU039	2		2
TU042			2
TU042			2
TU042			2
TU042			2
TU045			2
TU045	2		2
TU046	2		2
TU047	2		2
TU047			2
TU047			2
TU049			2
TU049			2
TU049	2		2
TU050A			2
TU050A			2
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2	Agencies revieved FU form for recommendation
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2	Navy recomm. Reanalysis of Archived Samples
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OB085
OB224
OB226
OB227
OB230
OB231
OB241
OB042
OB046
OB062
OB234
OB236
OB147
OB185
OB240
OB250
OB243
OB244
OB245
OB248
OB098
OB189
OB192
OB233
OB213
ES335

TU058			2
TU058			2
TU058			2
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TU060			2
TU061			2
TU061			2
TU062			0
TU062			0
TU062			0
TU062			0
TU063			0
TU063			0
TU063			0
TU063			0
TU064			0
TU065			2
TU065			2
TU065			2
TU128			2
TU186	2		2
	16	**4.00**	
	Percent	**Total TUs**	

18

Total FU's

2	
2	
2	
2	
2	
2	
2	
2	
2	
2	
2	
2	
2	Agencies revieved FU form for recommendation
2	Agencies revieved FU form for recommendation
0	Agencies revieved FU form for recommendation
2	Agencies revieved FU form for recommendation
0	Agencies revieved FU form for recommendation
0	Agencies revieved FU form for recommendation
0	Agencies revieved FU form for recommendation
0	Agencies revieved FU form for recommendation
2	Agencies revieved FU form for recommendation
2	
2	
2	
2	
2	
95.54	

Percent of total FUs

89 This includes: 84 FUs from w/in TUs recommended by agencies for resampling + 5 following form reviews.

Parcel B Trench Units with notes of signs of falsifiying and/or failure to follow workplan (which could create data quality c
Please Note: The score of 1 shows that a sign of falsifying or failure to follow the workplan (e.g. data quality problems) h
Trench Unit
TU001
TU002
TU003
TU004
TU005

concerns, even in the absence of signs of falisfication)
(This sheet shows the columns excerpted from Spreadsheet 1)
ave been noted. This does not indicate the severity of the concern.
So even if a concern has been noted, if the level of concern is relatively low, it still may not result in a recommendation f
In addition, please note that these observations were made in the 43 trench units that the Navy had previously designat
The compilation below does not include the 20 trench units that the Navy has already recommended for resampling
Overall score (0,1, or 2)
2
2
2
2
2

or resampling		
ed as "No Further Action.		
Signs of falsifying (1=Yes, 0=no)	Signs of falsification summary	Failure to follow workplan (1=Y, 0=N)
1	1) No Confirmatory/biased samples were collected with FSS 2) K-40 and Cs-137 had the lowest mean results of any TU in Parcels B & D-2 3) Q Q Plots for FSS results for Ac-228, Bi-214, and K-40 depict at lead two different data populations	1
1	1) K-40 had second lowest mean results of any TU in Parcels B & D-2 2) Q Q Plots for FSS results for Bi-214 depict at lead two different data populations	1
1	1) 16 of 18 FSS sample results for Cs-137 were less than zero.	1
1	1) No Confirmatory/biased samples were collected with FSS 2) Investigative data (67 samples) not provided in RACR or SUPR 3) Q Q Plots for FSS results depict at lead two different data populations for Ac-228, K-40, and Bi-214	1
1	1) Two Bi-214 FSS results elevated compared to Ra-226 result reported. 2) FSS results indicate at least two populations are present in Bi-214 data set.	1

Signs of failure to follow workplan
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) 34 investigative samples are not in the SUPR or RACR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR

Comments - Other
1) Significant data quality problems, indicated by the following: K-40 and Cs-137 had the lowest mean results of any TU in Parcels B & D-2 Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted building 157
1) Significant data quality problems, indicated by the following: K-40 had second lowest mean results of any TU in Parcels B & D-2 Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted building 157
1) Significant data quality problems, indicated by the following: Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted building 140
1) Significant data quality problems, indicated by the following: Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted buildings 140 and 142
1) Significant data quality problems, indicated by the following: Multiple Cs-137 results at or below 0 2) Offsite lab mass not reported for 6PBFS-005-115 3) Two FSS samples have high Bi-214 outliers.

TU006

TU007

TU008

TU009

2
2
2
2

1	1) One Bi-214 result in FSS reported at 0. 2) Pb-212 results were higher for TU006 than the average for Parcels b and D-2.	1
1	1) Differences in recorded collection date for sample 10; reported sample masses for this sample were different with the offsite lab recording an unusually low mass. It appears the onsite and offsite lab did not analyze the same sample. 2) Delayed counting of samples (12 and 14 through 18) of four days after collection. 3)Sample 10 had 2 collection dates, and reported sample masses were different between onsite and offsite lab. It appears the onsite and offsite labs did not count the same sample. 4) Delayed counting of samples (4 days). One sample was recounted in 2010 as part of a quality review. 5) Several Ac-228 results at or below 0; outliers identified for Ac-228, Bi-214, K-40 indicating potential data quality issues and/or falsification 6) Highest count recorded was 9,132 cpm for location 004. 7) No confirmation/bias samples collected	1
1	1) Seven FSS samples have results at 0 based on offsite lab results.; eight samples have low activities when compared to TU009.	1
1	1) Two samples counted one day. Remaining samples counted 3 days later.	1

1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR

1) No confirmatory/biased samples collected for FSS 2) One Bi-214 result in FSS was below zero. 3) Large range of K-40 values (2.778 - 19.527 pCi/g) 4) High static count recorded at 9,132 cpm compared to surrounding TUs. Offsite samples from Eberline Services are inconsistent with Ac-228 data from all TUs. 5) Pb-212 results were higher for TU006 than the average for Parcels B and D-2.
1) Scan and static data not provided in RACR or SUPR 2) Names of samplers/surveyors not provided in the SUPR 3) 16 of 18 FSS sample results for Cs-137 were less than zero.
1) Significant data quality problems, indicated by the following: Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted buildings 140 and 130
1) Significant data quality problems, indicated by the following: Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted buildings 140 and 130

TU010
TU011
TU012
TU013
TU014
TU015

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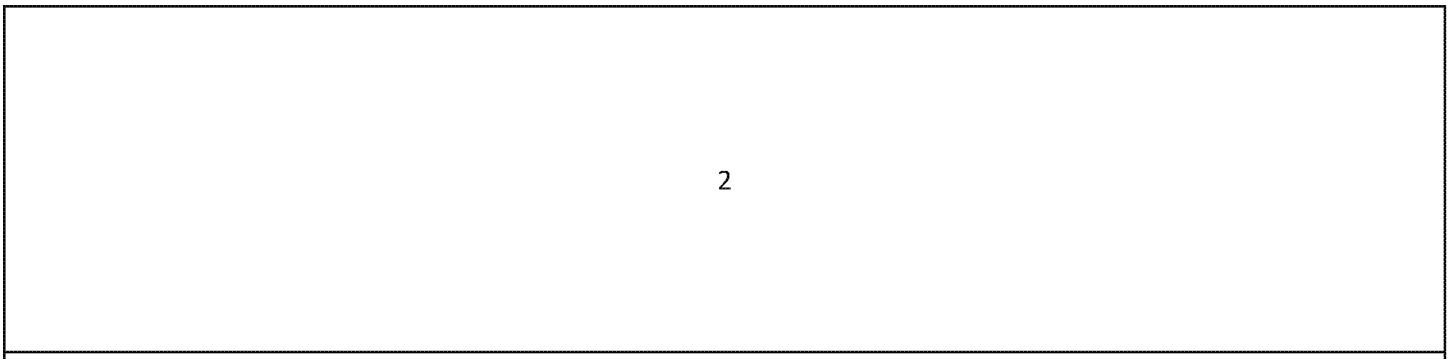
1	1) Form notes, "FSS samples (247 and 257) analyzed on 6/22/2007. • FSS samples (246, 251, 258, 250, 252, 256, 253, 254, 259, 261, 262, 255, and 260) analyzed on 6/23/2007. • FSS samples (258 and 263) analyzed on 6/26/2007." Analysis of samples on different days suggests potential substitution.	1
1	1) 11 samples counted 7 months later; potential for substitution.	1
1	1) Different populations for K-40, Ac-228 and very low variability for Bi-214 FSS data set.	1
1	1) Box Pots and QQ plots of RAS results for Ac-228, Bi-214, and K-40 appear to be from a different population than other surveys 2) Th-232 decay chain radionuclides are not in equilibrium in the FSS. 3) The Data Eval Form states in Section 4 "Gamma static counts ranged between 4960 and 5536, an unusually narrow range for heterogeneous material. However, the gamma static counts are consistent with the gamma scan range, but are not consistent with the analytical results of the FSS dataset." The inconsistencies in the pattern of data ranges and lack of comparable results indicates falsification most likely occurred.	1
1	1) Ac-228, Bi-214, and K-40 all have extremely low variance in the FSS results. The unusual small variance in results can not be explained by any reasonable argument, therefore the reviewer believes this is an indication of falsification 2) Missing scan and static data in SUPR, in addition to the noted lack of normal variability in the FSS results for Ac-228, Bi-214, and K-40 indicate the data may have been falsified. Additionally, TU014 underwent at least five excavations. The need to perform multiple excavations and sampling may have provided a motive for falsifying results.	1
1	1) The Data Eval Form states "The comparison results for samples (110 and 124) were not equivalent for K-40, Ac-228, and Bi-214." 2) FSS samples (111 through 115, 117 through 124 and 127) were counted on 1/7/2007. Sample 125 was counted on 9/10/2010. Only samples 110, 116, and 126 were counted within 2 working days on 12/21/2006. The Christmas and New Year's holidays occurred during this period.	1

1) RSO Signature missing from Gamma Static and Scan Data. 2) All samples analyzed in June 2007 except for one analyzed on October 8, 2010
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR
1) Sampler/surveyor name not provided in Work Plan.
1) Gamma static and scan surveyor is not listed in the SUPR 2) No FSS Bias samples collected
1) Scan and static measurement data did not contain the RSO signature.

1) 11 samples recounted 7 months later. No explanation for this.
1) FSS Results for the thorium series included two negative Ac-228 results, Bi-212 at 0.47 pCi/g, and Tl-208 at 0. These concentrations do not indicate that the Th-232 decay chain is in equilibrium as would be expected for native soils. This data indicates there are data quality issues, and may also be associated with falsification of results. 2) Sample 6PBFS-013-29 counted onsite on 10/02/06, and recounted about 2 years later on 12/01/08 by offsite lab. 3) Fss-SYS, FSS-BIAS and RAS samples all collected on 9/25/2006
This TU014 was located downstream and/or was connected to a radiologically-impacted building (Bldg. 114), indicating a higher likelihood that the Sewer lines and trench were radiologically contaminated.
1) The Data Eval Form 'Summary of Findings' Summary of Findings states "The mean results for Bi-212, Pb-212, and Ac-228 were all higher than average for Parcel B...."The Bi-214 and Pb-214 mean results were also higher than average for Parcel B.." 2) One Bi-214 result was negative and offsite and onsite analyses of samples 110 and 124 are not consistent. 3) Soil probably used as backfill on Parcel C.

TU016

TU017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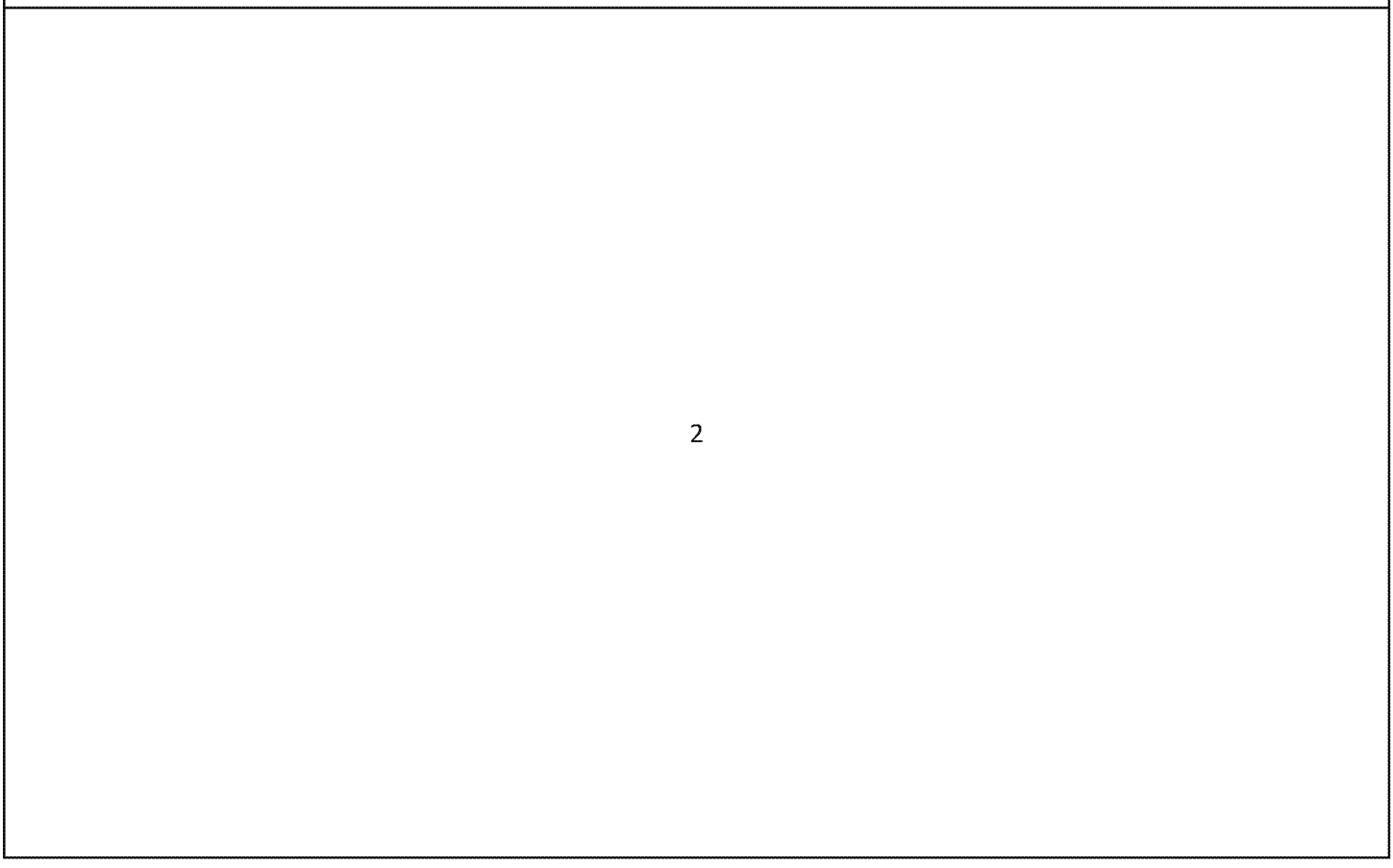
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1	1) Missing scan and static data and signature of surveyors or samples missing 2) Inconsistency between offsite and onsite lab results between onsite and offsite lab, large range of K-40 values 3) Long time interval between when samples 066, 068, 073, and 078 were collected (2006) and analyzed (9/13/10). Data Eval Form states "FSS samples (066, 068, 073, and 078) were analyzed on 9/13/2010. The sample collection date was on 12/28/2006.	1
1	1) Logic Test 4 states FSS samples 072, 076, 077, 079, 080, and 081 analyzed within 2 working days. FSS samples 064, 065, 070, and 075 were analyzed on 12/1/2006. FSS samples 067, 069, 073, and 078 were analyzed on 9/13/2010. The analysis of samples over 3 years later is suspicious. 2) The approval data for the Static Survey of 3/6/2008 pre-dates when the Static Survey was conducted on 11/28/2006. The Data Evaluation Form states "The survey date seems to be a mistake." However, the reviewer notes that the difference in dates is unusual and can not be dismissed under an assumption that this was a mistake. 3) The Data Evaluation Form states "The scan survey was performed on 11/28/2007. The survey date seems to be a mistake. The FSS samples were collected on 11/28/2006". The reviewer notes that given the fact that the scan, static, and FSS survey/sample collection dates do not follow the expected chronological order, this is evidence of falsification of data. 4) The Data Evaluation Form states "The K-S Test Flagged Pb-214, which was reported at higher concentrations than other survey units in Parcel B." The reviewer notes that a higher Pb-214 indicates elevated Ra-226 is present. Further investigation will be needed to identify what value of Ra-226 was reported by the lab compared to the elevated Pb-214 result in order to determine if this is an indication of data falsification or a data quality issue.	1

1) Gamma static and scan results were not provided in the SUPR 2) Gamma static and scan surveyor is not listed in the SUPR 3) Names of surveyors/samplers not provided in SUPRs.
1) RSO signatures are missing from Static and Scan Survey data. 2) Sampler/Surveyor names are missing from the SUPR.

1) The Summary of Findings states "The K-S Test Flagged Pb-214, which was reported at higher concentrations than other survey units in Parcel B." A higher Pb-214 indicates elevated Ra-226 is present. The Data Eval Form does not state if the Pb-214 and Ra-226 results from the analysis were comparable. This information would provide insight into whether results in TU017 were falsified or not.

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1	1) The Data Evaluation Form Summary of Findings states "The K-S test flagged Pb-214, Ac-228, and Pb-121. These radionuclides, plus Bi-214 and Bi-212, presented higher-than-average results in TU018 compared to the rest of Parcel B. High results are not considered to be evidence of potential data falsification." The reviewer notes, however, that elevated concentrations of Bi-214 and Pb-214 indicate the presence of elevated Ra-226, but the Data Evaluation Form does not state if comparable Ra-226 results were reported and if so, if these levels exceeded the release criteria. Elevated levels of Bi-212 and Ac-228 indicate elevated concentrations of Th-232, however the Data Evaluation Form has not stated if this is the case or if the data are deemed to be anomalous. Further investigation by the Navy is needed. 2) The Data Evaluation Form Logic Test 4 provides FSS analysis dates, as follows: "FSS samples 048 through 052, 054, 055, 056 through 062, 064, and 065 were analyzed on 1/7/2007. ... FSS sample 063 was analyzed on 1/4/2007." Analysis of one sample on 1/4/07 suggests potential for substitution.	1
1	1) On- and offsite samples had a different weight for sample 027 (difference of 102 grams). 2) Bi-214, K-40, Bi-212, all had the 3rd lowest results of all the TUs in Parcels B & D-2. In addition, Pb-214 mean results is the lowest of all TUs in Parcels B & D-2. The Data Evaluation Form argues that adjacent TU012 also had abnormally low mean concentrations in an area where the two TUs adjoin and therefore may represent a different soil type is represented rather than an indication of falsification. The reviewer acknowledges this may be the case but with the existing data, and the extensive data quality issues highlighted in data throughout Parcel B, sufficient information does not exist to determine the reason for the low values. The reviewer also notes that it is also possible the unusually low mean values for this data may be due to falsification.	1
1	1) Gamma static and scan date and time not provided in the SUPR 2) Gamma Static Survey data ranged between 5,583 and 6,708 cpm. The Data Evaluation Form states this range is consistent with the gamma scan data; however the scan survey data ranged from 4.200 and 7,100 cpm. Therefore, the Static data is not consistent with the scan data since the range for the static surveys is very small compared to the scan data and what would be expected for environmental surveys of land areas. 3) Suspect worker involved in data collection at TU020.	1

1) Site RSO signature missing from Gamma Static and Scan data in the SUPR.
1) Gamma static and scan surveyor is not listed in the SUPR
1) Gamma static and scan date and time not provided in SUPR.

Resample due to different collection dates for samples for on- and off-site labs and uncertainty due to multiple populations in K-40 data.
Form notes, "Ac-228 mean result is the lowest of all TUs in Parcels B & D-2. ... Bi-214 mean result is 3rd lowest of TUs in Parcels B & D-2. ... K-40 mean result is 3rd lowest of TUs in Parcels B & D-2. ... Pb-212 mean result is 3rd lowest of TUs in Parcels B & D-2. ... Pb-214 mean result is the lowest of all TUs in Parcels B & D-2." Form concludes these are within the expected ranges.

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1	1) Gamma Static Survey data ranged between 5,728 and 6,427 cpm. In contrast to the Data Evaluation Form for TU0020, the Data Evaluation Form for this TU 0021 states this range is an unusually narrow range for heterogeneous soil but is consistent with the gamma scan range and the FSS dataset. Scan survey data ranged from 5.200 and 6,800 cpm. The reviewer notes that the Static and Scan data have too narrow of a range and therefore is suspect for falsification. 2) For the FSS sample 06, the onsite/offsite K-40 results differ by more than a factor of 10x (7.796 vs. 0.707). Other data compares satisfactorily. The reviewer notes that having radionuclides of concern have comparable values between onsite and offsite data, but very different K-40 results has been proven in the past to be an indication of data falsification and is highly suspect for this TU021. 3) Section II, Item 2 of the Data Evaluation Form states "Final Systematic samples from this TU contain low mean concentrations of Bi-214, K-40, Pb-212, and Pb-214 compared to other TUs in Parcels B & D02. In addition, the fact that TU020 and TU021 were sampled on the same day likely resulted in the disparity between Units and Days flags.	1
0		1
1	1) Some samples were counted between 03/14/2207 and 03/19/2007. Samples #174, #179, #181-183 were counted on 09/09/2010 and 09/10/2010. 2) No name of static or scan surveyor provided in SUPR	1
2	1) FSS samples were collected on 11/16/2006. FSS confirmatory/biased samples were collected on 11/01/2006. 2) One final systematic sample has a result below 0 for Bi-214. Sample may have been substituted 3) on- and off-site lab sample had different weights	1
1	1. Samples were counted onsite 10/13/2006, with the exception of #2, #6, and #12, which were counted on 09/13/2010. Sample #14 was counted offsite on 11/22/2008. Substitution possible.	1
0		0
1	Form notes, "FSS samples excluding #2 and #3 were counted onsite from 11/07/2006 to 11/09/2006. FSS samples #2 and #3 were counted on 09/21/2010. Sample #16 was counted offsite on 11/25/2008."	1
1	Some samples counted years later, unclear if these were the original samples.	1
1	On-site lab counted samples over 4 days.	1
0		1
0		1
0		1

Numerous discrepancies noted in the data (i.e., unusually low values and data ranges, negative Ra-226 values), discrepancies in K-40 results between onsite and offsite labs, yet no other sampling was conducted to confirm conditions at TU021.
None.
1) 2) No name of static or scan surveyor provided in SUPR 2) Some samples were counted between 03/14/2207 and 03/19/2007. Samples #174, #179, #181-183 were counted on 09/09/2010 and 09/10/2010.
No static survey date and time, no sampler name.
No static survey date and time, no sampler name.
No static survey date and time, no sampler name.
No static survey date and time, no sampler name.
No signature from RSO on gamma static or scan surveys.
Static surveyor name not provided in SUPR.
No static survey date and time, no sampler name.
Sampler/surveyor name not provided in SUPR.

1) TU0021 contained the sewer line that was connected to or downstream from the radiologically-impacted Building 103. 2) Section II, Item 2 of the Data Evaluation Form states "Final Systematic samples from this TU contain low mean concentrations of Bi-214, K-40, Pb-212, and Pb-214 compared to other TUs in Parcels B & D02. In addition, the fact that TU020 and TU021 were sampled on the same day likely resulted in the disparity between Units and Days flags. 3) Section II, item 2 of the Data Evaluation Form states that a review of the Ra-226 data shows that the Ra-226 concentrations in several samples have large negative values and are "apparently statistically indistinguishable from the remediation action level." The reviewer notes that large negative values of the Ra-26 data indicates a data quality issue and therefore such data is not reliable for decision making/demonstrating the ROD criteria has been met.
As in all other TUs, significant data quality issues exist, making the data unreliable for decision making and in demonstrating compliance with the ROD release criteria.
FSS samples could have been substituted in 2010 when recounted 3 years after collection. Recommend resampling due to low variability Bi-214 and uncertainty about recounted samples.
Recommend resampling due to uncertainty - different sample masses, low variability for Bi-214
Some uncertainty because samples counted over 4 years. 2010 counts may be due to recounting at request of Navy or CDPH.
Several Final Systematic Bi-214 samples present as outliers
FSS samples excluding #2 and #3 were counted onsite from 11/07/2006 to 11/09/2006. FSS samples #2 and #3 were counted on 09/21/2010. Sample #16 was counted offsite on 11/25/2008.
Single set of FSS_SYS samples suggests falsification less likely; work done in 2006.

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1	Form notes, " Samples were counted on 03/14/2007 or 03/15/2007; five samples were re-analyzed in 2010 during lab method review by EPA and CDPH" and ". A combination of samples analyzed in March 2007 and reanalyzed samples from September 2010 were reported as the FSS survey results." Unclear why the original on-site lab results were replaced. May explain different populations, or not.	1
1	Form notes, "Samples 6PBFS-039-10, -12, -13, -16, -17 through -19, and -22 through -26 were all analyzed more than 2 days after collection."	1
1	Form notes, "One FSS sample (040) were analyzed on 02/28/2007." This suggested	1
0		1
1	FSS_SYS Samples counted on 4 days and not sequentially.	1
1	1. FSS_samples were counted over 1 week, suggesting possible substitution. Form notes, "Samples were counted from 03/21/2007 through 03/28/2007." 2. Different weights (2 grams) between on-site and off-site lab.	1
1	1. FSS_samples were counted over 6 days suggesting possible substitution. Form notes, "Samples were counted between 03/23/2007 and 03/28/2007." 2. Samples have different weights. Form notes, " 6PBFS-044-01 has an onsite lab mass of 357 grams and an offsite lab mass of 374 grams, 6PBFS-044-12 has an onsite lab mass of 318 grams and an offsite lab mass of 324 grams."	1
1	1. Form notes, "FSS samples were counted within 2 days of collection. FSS-BIAS samples 6PBFS-045-001 and -035 were counted between 23 and 34 days after collection." Suggests possible substitution. 2. Low variability and inconsistent gamma static data.	1
1	1. Form notes, " None of the FSS samples (6PBFS-046-01 to -18) were analyzed within 2 working days." Also, "Sample -01 was counted on 04/10/2007," which is more than 2 weeks after collection. Possible indication of sample substitution.	1
1	1. Form notes, "FSS samples 6PBFS-047-74 through -80, -82 through 90 were analyzed on 06/30/2007. FSS samples 6PBFS-047-81 and -91 were analyzed on 06/22/2007." Also, "FSS-Bias samples 6PBFS-047-25 through -43 were analyzed 24 days after collection. All other samples were counted within 2 weeks of sample collection." This suggests potential substitution.	1

Gamma static form undated.
No static survey date and time, no sampler name.
No signature from RSO on gamma static or scan surveys.
No static survey date and time, no sampler name.
No signature from RSO on gamma static or scan surveys.
No static survey date and time, no sampler name.
No static survey date and time, no sampler name.
No sampler/surveyor name in SUPR
No sampler/surveyor name in SUPR
No static survey date and time, no sampler name.

Resample due to low Bi-214 FSS_SYS variability, evidence of multiple data sets.
Resample due to different weights for on-site/off-site lab samples, fact that samples were counted later than others, indications of different populations for Bi-214, K-40, and Ac-228.
Resample due to different weights for on-site/off-site lab samples, indications of different populations for Bi-214, K-40, and Ac-228, and low variability and evidence of different populations for Bi-214, Ac-228, and K-40.
1. FSS_SYS Samples counted on 4 days, and not sequentially. Form notes: " • FSS sample (132) analyzed on 07/14/2007 • FSS samples (117, 121, 122, 126, 127, 129, 131, and 134) analyzed on 07/17/2007 • FSS samples (118, 133, 120, 124, 123, 125, 128, and 130) analyzed on 07/18/2007. • FSS sample (119) analyzed on 07/19/2007." 2. Resample due to samples being counted on 4 different days and not sequentially (suggests potential for sample substitution), FSS_Bias having lower variability than FSS_SYS for Ac-228, Bi-214, and K-40, and evidence of different populations between data sets on Q-Q plots.
Resample due to sample counting over 1 week (potential for substitution),different weights between on-site and off-site lab, large difference in 1 Ac-228 result, and evidence of different populations on Q-Q plots.
Resample due to FSS sample counting over 6 days (potential for substitution), significant differences between on-site and off-site sample weights (not clear the same samples were counted), and the evidence for multiple populations based on the K-40 Q-Q plot.
Resample due to multiple populations for Bi-214, Ac-228, and K-40 and counting 2 FSS_Bias samples much later (suggests substitution).
Resample due to multiple populations for K-40 and possibly B-214 and because one FSS_Bias sample was counted on a completely different day than the others (which were not counted within 2 days of collection). These indicate possible sample substitution
Resample due to multiple populations for K-40 and probably for Ac-228 and Bi-214, and because 2 samples were analyzed on a different das, suggesting potential substitution. FSS_Bias samples, which Q-Q plots indicate are a different population were counted 24 days after collection.

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1	1. Form notes, "• One FSS sample (012) was analyzed on 05/07/2007. • One FSS sample (006) was analyzed on 05/11/2007. • One FSS sample (002) was analyzed on 05/15/2007. • One FSS sample (008) was analyzed on 09/09/2010. • One FSS sample (005) was analyzed on 09/10/2010. • One FSS sample (016) was analyzed on 09/05/2010. • FSS samples (001, 003, 004, 007, 009, 010, 011, 013, 014, 015, 017, and 018) were analyzed on 05/12/2007." 2. Even without the samples analyzed in 2010, the fact that samples were counted on different days suggests the potential for falsification.	1
1	Unusually low range for gamma statics; gamma static survey is inconsistent with gamma scan and FSS data.	1
1	1. Form notes: "Gamma static dataset inconsistent (low variability) with scan data and Final Systematic sample dataset with results between 3,998 and 4,855 cpm." Also, "Gamma scan dataset is not consistent with static data or Final Systematic sample dataset." 2. Low variability for Bi-214, Ac-228, K-40 FSS_Bias samples	1
1	1. Gamma static dataset low variability and inconsistent with scan data and Final Systematic sample dataset with results between 3,903 and 4,310 cpm. Also, "Gamma scan dataset is not consistent with static data or Final Systematic sample dataset."	1
1	1. Gamma scan and gamma static data are inconsistent with each other and inconsistent with the FSS data. 2. Collection of FSS_SYS samples on two days may be indication of falsification, particularly since one sample, 336, was collected out of order on the 2nd day.	1
1	1. Gamma static and gamma scan data are consistent with each other, but inconsistent with the FSS_SYS data. 2. Collection of a single FSS_SYS sample 2 days after collection of the others.	1
0		1
1	1. Resample due to low variability of FSS_SYS and FSS_Bias for Bi-214, apparent different population for K-40 FSS_Bias, and inconsistent off-site lab results.	0
1	1. One sample sent to the off-site lab had a different weight than the sample counted by the off-site lab; suggests a different sample may have been sent.	1

No signature from RSO on gamma static or scan surveys.
No signature from RSO on gamma static or scan surveys.
SUPR did not have static survey date and time
SUPR did not have static survey date and time
SUPR did not have static survey date and time
SUPR did not have static survey date and time
No signature from RSO for gamma survey and scans
1. No date or time for gamma statics in SUPR.

Resample due to potential substitution - samples were counted over 12 days according to the form, but only one sample was analyzed on some days. Also, there is little variability for Bi-214 and evidence of multiple populations.
1. TU49 modified after 5 rounds of excavation and sampling to move contaminated area to TU 50. 2. Resample due to low variability gamma statics, which were inconsistent with FSS data, as well as low variability FSS_SYS data for Bi-214, Ac-228, Cs-137 and low variability FSS_Bias for K-40.
1. Resample due to low variability gamma static data set that was inconsistent with scan data and the FSS data set and inconsistency between gamma scan and FSS data set. Also, low variability of B-214, AC-228, K-40 FSS_Bias samples suggests these are not related to the gamma scan data.
1. Resample due to low variability gamma static data set that was inconsistent with scan data and the FSS data set and inconsistency between gamma scan and FSS data set. Also, there are multiple populations for K-40.
1. After 23 rounds of excavation and sampling, the Ra-226 contaminated portion of the trench became a new trench unit, TU 051A, but it is unclear if all of the Ra-226 contamination was in the area that became TU 051A from the beginning. 2. Form notes about dates FSS_SYS samples were collected, "FSS samples 6PBFS-051-334, -335, -337 through -340, -345 through -351 were collected on 02/18/2008. Samples -336, -341 through -344 were collected on 02/19/2008." Although the Form concludes this is not evidence of falsification, it could be, particularly, since sample 336 was collected out of sequence. 3. Resample due to inconsistent gamma scan and gamma static data, low variability gamma static data, evidence that there are different populations (low variability Ac-228 and Bi-214 FSS_SYS), and potential falsification associated with sampling over multiple days.
1. This TU was split from TU 051 after it underwent 23 rounds of excavation and sampling; 9 more round of excavation and sampling conducted on TU 051A (for a total of 32). 2. One FSS_SYS sample collected 2 days after the others. 3. Resample due to inconsistent gamma scan/static data with FSS data set, low variability Bi-214, Ac-228, and K-40 FSS samples, and collection of one FSS_SYS sample 2 days after collection of the others - possible substitution.
1. Appears off-site lab had trouble with Ac-228 analysis.
1. Resample due to low variability of FSS_SYS and FSS_Bias for Bi-214, apparent different population for K-40 FSS_Bias, and inconsistent off-site lab results.
1. 1 out of 7 off-site lab samples had inconsistent weight with the on-site lab samples, which may be an indication of falsification. 2. Resample due to inconsistent weight of one off-site lab sample, low variability FSS_SYS for Bi-214 and K-40, apparent different population of K-40 characterization samples.

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Please Note: The scoring as 1 shows that a sign of falsifying or failure to follow the workplan (e.g. data quality problems)

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have been noted. This does not indicate the severity of the concern.

So even if a concern has been noted, if the level of concern is relatively low, it still may not result in a recommendation f

1	Static max is less than 1/2 of the gamma scan max.	1
0		1
1	1. Gamma scan and gamma static data are inconsistent with the FSS laboratory data.	1
1	1. On- and off-site weights for sample 92 were different, suggesting possible sample substitution. 2. Form notes inconsistent results between off-site and on-site lab for multiple radionuclides.	1
1	1. FSS_SYS Samples collected over two days. K-40 has much higher variability and Cs-137 has a much lower variability for samples collected the second day, suggesting different population. Bi-214 samples collected the first day have a lower mean and lower variability than those collected the second day.	1
0		1
		1
1	1. Gamma scan and gamma statics were inconsistent with each other. Gamma statics had low variability.	1
1	1. Gamma scan conducted after or during collection of FSS_SYS samples.	1
1	1. Nearly identical gamma scan and gamma static data ranges. 2. K-40 data appear to indicate different sources for FSS_SYS and FSS_Bias samples.	1
1	1. Unusually consistent gamma scan and gamma static data ranges. 2. Possible factor of 8 or 9 difference between on-site and off-site lab results. 3. No FSS_Bias samples even though there were exceedences in the gamma scan and gamma static data.	1
1	1. Samples appear to be from different sources (data sets have different slopes and slope breaks)	1
1	1. Possible failure to collect gamma scan after final excavation and before FSS_SYS samples were collected. 2. Possible factor of 8 or 9 difference between on-site and off-site lab results. 3. Data indicate different sources (populations) for Bi-214, K-40 and Ac-228.	1
1	1. Four samples analyzed by on-site lab 8 days after the other 14 samples were analyzed, which could indicate sample substitution. 2. Different slopes for each K-40 data set indicates different populations, suggesting different sample sources.	1
or resampling		

1. No RSO signature for gamma scans or survey.
1. No RSO signature for gamma scans or survey.
1. No RSO signature for gamma scans or survey.
1. No RSO signature for gamma scans or survey.
No reviewer or report data for gamma statics.
No reviewer or report data for gamma statics.
1. No RSO signature for gamma scans or survey.
SUPR did not have static survey date and time
SUPR did not have static survey date and time
No reviewer or review date for gamma statics.
No reviewer or review date for gamma statics.
SUPR did not have static survey date and time
1. SUPR did not have static survey date and time. 2. Gamma scan may not have been conducted after final excavation.
No sampler name.

1. Resample due to low variability of FSS_SYS for Ac-228 and Bi-214 and FSS_Bias for Bi-214 and Cs-137 and inconsistent gamma statics.
1. Resample due to low variability and inconsistent K-40 samples, inconsistent off-site lab results.
1. Resample due to gamma scan and static data inconsistency with FSS lab data, multiple populations for K-40, and low variability Bi-214 FSS data.
1. Resample due to different weights for on- and off-site lab and counting of samples at off-site lab over a year later, suggesting possible sample substitution; inconsistent results between off-site and on-site lab; and low variability in Bi-214 FSS_SYS data set.
1. Resample due to uncertainty. FSS_SYS samples collected on two days but show significantly different results, suggesting different populations. FSS_Bias samples for K-40 and Bi-214 have lower variability than FSS_SYS. Also, gamma static max is a bit low.
1. Multiple populations do not necessarily indicate falsification.
1. DON had one sample recounted as part of a quality review.
1. Resample due to inconsistent gamma scan and gamma statics, low variability Bi-214 FSS_SYS.
1. Resample due to apparent different populations of K-40 between FSS_SYS and FSS_Bias, low variability of Ac-228 and Bi-214 FSS_SYS and FSS_Bias.
1. Multiple flags for K-S test (compared to results from B and D-2). Ac-228 mean 7th lowest. K-40 mean 7th highest. Bi-212 mean is 7th lowest. Pb-212 is 12th lowest. 2. Resample due to unusually consistent gamma static and gamma scan data, low variability FSS_SYS and FSS_Bias for Ac-228 and Bi-214 and K-40 FSS_SYS, and the potential that the K-40 sample indicate different sources.
1. Resample due to unusually consistent gamma scan and gamma static data ranges, failure to collect bias samples when there were gamma scan and gamma static exceedences, multiple populations in FSS_SYS data for Ac-228, Bi-214, K-40.
1. Resample due to different sample sources, based on K-40 and Ac-228 Q-Q plots.
1. Resample due to different sources as indicated by the Bi-214, K-40, and Ac-228 data, possible large differences between on- and off-site lab data, and potential failure to collect gamma scan data after final excavation.
1. Form notes about sample analysis, "Samples 55-58, 60, 62-64, 66, and 68-72 were analyzed on 11/10/10. Samples 59, 61, 65, and 67 were analyzed on 11/18/2010." This is suspicious - there may have been sample substitution for the 4 samples analyzed more than a week later. 2. Resample due to potential sample substitution of 4 samples in FSS_SYS set and probable different sample source for FSS_SYS, FSS_Bias, SYS_1, and characterization samples based on K-40 Q-Q plots.

Parcel B Trench Units with notes of signs of falsifiying and/or failure to follow workplan (which could create data quality c
Please Note: The score of 1 shows that a sign of falsifying or failure to follow the workplan (e.g. data quality problems) h
Trench Unit
Total Count
TU001
TU002
TU003
TU004
TU005
TU006
TU007
TU008
TU009
TU010
TU011
TU012
TU013
TU014
TU015
TU016
TU017
TU018
TU019
TU020
TU021
TU022
TU023
TU024
TU025
TU026
TU027
TU028
TU029
TU030
TU033
TU036
TU037

concerns, even in the absence of signs of falisfication)
(This sheet shows the columns excerpted from Spreadsheet 7, which has excerpts from Spreadsheet 1)
ave been noted. This does not indicate the severity of the concern.
So even if a concern has been noted, if the level of concern is relatively low, it still may not result in a recommendation f
In addition, please note that these observations were made in the 43 trench units that the Navy had previously designat
The compilation below does not include the 20 trench units that the Navy has already recommended for resampling
Overall score (0,1, or 2)
51
2
2
2
2
2
2
2
2
2
2
2
2
2
2
2
2
0
2
2
2
2
2
2
2
0
2
2
0
0
0
0
0
0
0
0
2

or resampling

ed as "No Further Act

Signs of falsifying (1=Yes, 0=no)	Failure to follow workplan (1=Y, 0=N)
56	63
1	1
1	1
1	1
1	1
1	1
1	1
1	1
1	1
1	1
1	1
1	1
1	1
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1	1
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1	1
1	1
1	1
1	1
1	1
1	1
0	1
1	1
2	1
1	1
0	0
1	1
1	1
1	1
0	1
0	1
0	1
1	1

TU039
TU040
TU041
TU042
TU043
TU044
TU045
TU046
TU047
TU048
TU049
TU050
TU050A
TU051
TU051A
TU052
TU053
TU054
TU055
TU056
TU058
TU060
TU061
TU062
TU063
TU064
TU065
TU125
TU126
TU127
TU128
TU131
TU186
Please Note: The scoring as 1 shows that a sign of falsifying or failure to follow the workplan (e.g. data quality problems)

2
2
0
2
2
2
2
2
2
2
2
2
2
2
2
2
2
0
2
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2
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0
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0
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2
2
2
have been noted. This does not indicate the severity of the concern.
So even if a concern has been noted, if the level of concern is relatively low, it still may not result in a recommendation f

1	1
1	1
0	1
1	1
1	1
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1	1
1	1

or resampling

CDPH review of Building Site Survey Units

Building Site	Survey Unit	Box Plots	Q-Q Plots	Rounds of excavation
114	SU 1	NA	NA	0 rounds of excavation, no bias samples collected
114	SU 2	NA	NA	0 rounds of excavation, no bias samples collected
130	SU 8	NA	NA	0 rounds of excavation, no bias samples collected
130	SU 17	NA	NA	0 rounds of excavation, no bias samples collected

Gamma scan or static concerns	On vs offsite lab
The gamma static data are consistent with the scan data and the reference area dataset. The gamma scan data is consistent with the static data and the reference area dataset.	Offsite lab samples for Sr-90 have 4 to 5 times the mass compared to the onsite lab. 34 available isotopes comparisons between onsite and offsite data 5 had differences greater than a factor of ten. However, all of these values near zero. FSS samples were collected from 05/26/2005 to 06/14/2005, however samples were counted between 05/01/2007 and 05/03/2007.
The gamma static data are consistent with the scan data and the reference area dataset. The gamma scan data is consistent with the static data and the reference area dataset.	The samples that were send to the offsite lab for Sr-90 analysis have larger mass than the samples that were processed onsite. FSS samples were collected from 05/26/2005 to 06/14/2005, Samples were counted between 05/01/2007 and 05/03/2007.
Gamma Scan Data not provided in FSSR, The data package for SU-008 in the FSSR reports 340 static gamma measurements ranging from -1,033 net gamma cpm to 1,096 net gamma cpm, with mean value -192 and standard deviation 487. The gamma background was 6,899 cpm and the 3-sigma investigation level was 6,899 cpm. No measurements exceeded the investigation level.	Samples 1-20 were collected on 01/14/2009. Sample 1-9 were counted on 01/14/2009 (same working day), and samples 10-20 were counted on 01/15/2009 (after 1 working day). Two field duplicate (#5 & #10) samples were counted on 09/23/2009.
Gamma Scan Data not provided in FSS. The data package for SU-017 in the FSSR reports 250 static gamma measurements ranging from -928 net gamma cpm to 1,807 net gamma cpm, with mean value -241 and standard deviation 447. The gamma background was 6,899 cpm and the 3-sigma investigation level was 9,160 cpm. No measurements exceeded the investigation level. The investigation level was 4.5 sigma values above the mean.	Samples 1-20 were collected on 01/14/2009. Sample 1-19 were counted on 01/19/2009 (after 3 working days), and sample 20 was counted on 01/20/2009 (ater 4 working days). Two field duplicate (#1 and #9) samples were counted on 09/23/2009. The data is consistent for K-40 and Bi-214. The resulsts for Ac-228 are approximately double.

Time Series	Suspect name (1=yes, 0=no)	Name, if suspect	Name, if not suspect	Signs of falsifying (1=Yes, 0=no)	Signs of falsification summary	Failure to follow workplan (1=Y, 0=N)
NA	0	No Scan/Static Surveyor Name Provided	No Scan/Static Surveyor Name Provided	1	FSS samples collected over a period of 19 days and the onsite lab analysis was not completed for two years. FSS samples were collected from 05/26/2005 to 06/14/2005, Samples were counted between 05/01/2007 and 05/03/2007.	0
NA	0	No Scan/Static Surveyor Name Provided	No Scan/Static Surveyor Name Provided	1	FSS samples collected over a period of 19 days and the onsite lab analysis was not completed for two years. FSS samples were collected from 05/26/2005 to 06/14/2005, Samples were counted between 05/01/2007 and 05/03/2007.	0
NA	0	No Scan/Static Surveyor Name Provided	No Scan/Static Surveyor Name Provided	1	Sample #10 presented a K-40 Results near zero. Two field duplicates 5 and 10 samples were counted on 9/23/2009, 251 days after all other samples were analyzed, possibly providing an opportunity to replace and reanalyze the sample. No explanation of the unusual delay in analysis was provided in the report.	1
NA	0	No Scan/Static Surveyor Name Provided	No Scan/Static Surveyor Name Provided	1	Two Field Duplicate samples 1 and 9 was analyzed 247 days after all other samples were analyzed, possibly providing an opportunity to replace and re-analyze the sample. No explanation of the unusual delay in analysis was provided in the reports.	1

Signs of failure to follow workplan	Comments - Other	Followup needed, e.g. questions for Navy
NA	FSS samples were collected from 05/26/2005 to 06/14/2005, Samples were counted between 05/01/2007 and 05/03/2007. Scan/Static Surveyor Name Not Provided	Explain the delay of soil collection and counting dates
NA	FSS samples were collected from 05/26/2005 to 06/14/2005, Samples were counted between 05/01/2007 and 05/03/2007. Scan/Static Surveyor Name Not Provided	Explain the delay of soil collection and counting dates
Gamma scan data not provided in FSSR.	Sample #10 presented a K-40 Results near zero. Two field duplicates #5 and #10 samples were counted on 9/23/2009, 251 days after all other samples were analyzed, possibly providing an opportunity to replace and reanalyze the sample. No explanation of the unusual delay in analysis was provided in the report. Scan/Static Surveyor name not provided in FSSR. The investigation level was 4.2 standard deviations above the mean.	Why is Sample #10 K-40 is zero? Explain the delay in soil analysis. Explain why two field duplicates #5 and #10 samples was counted 251 days after all the other samples were analyzed. Explain why the gamma static release criteria was increased to mean + 4.2 standard deviation.
Gamma Scan data not provided in FSSR.	Two Field Duplicate samples #1 and #9 was analyzed 247 days after all other samples were analyzed, possibly providing an opportunity to replace and re-analyze the sample. No explanation of the unusual delay in analysis was provided in the report. Scan/Static Surveyor Name not provided in FSSR	Explain the delay in soil analysis. Explain why two field duplicates #1 and #9 samples was counted 247 days after all the other samples were analyzed. Explain why the gamma static release criteria was increased to mean + 4.5 standard deviation.

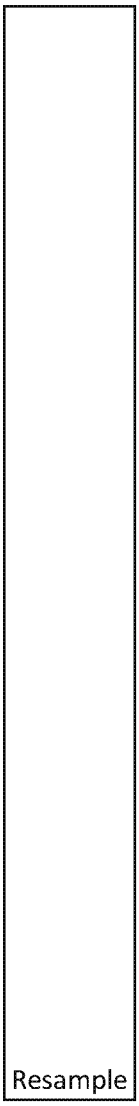
CDPH Recommendation
Resample
Resample
Resample
Resample

142	SU 1	NA	NA	Characterization and final systematic samples collected in Survey Units 1 and 2 are representative of two different soils, separated by what was defined in the FSSR as a second subsurface structure. Characterization samples were collected from above the subsurface structure, and final systematic samples were collected below the subsurface structure, where the FSSR Identified the orginal footprint was located.

One-minute static counts collected at each of the 16 systematic locations on 02/08/2007 by J. Hubbard. Gamma static counts ranged between 2,135 and 4,806 counts per minute (cpm). "Characterization" gamma scan (100% coverage) performed on 09/06/2006 (the day after sampling) by J. Hubbard. Range was between 2,000 and 6,000 cpm – less than the investigation level of 6,092 cpm. Background rate was 5,400 cpm. "Final Status" gamma scan performed 02/08/2007 (the day after sampling) by J. Hubbard. Range was between 4,900 and 6,000 cpm - less than the background +3 sigma (σ) investigation level of 6,581 cpm. Background rate was 5,100 cpm.	All Final Systematic samples were collected on 02/07/2007. FSS samples were collected after confirmatory/biased samples which were collected on 09/05/2006.Most FSS samples (14 of 16) were analyzed within 3 working days; the other two FSS samples were analyzed within 1 working day. Onsite and offsite data were consistent.

One FSS sample had a near-zero result for Bi-214, sample 6PB142SU1-22. There was also two negative Ac-228 FSS results (6PB142SU1-018 and 6PB142SU1-025)	1	J Hubbard / D Rosenhagen	NA	1	“Characterization” gamma scan performed the day after sampling. "Final Status" gamma scan also performed after sampling.	1

“Characterization” gamma scan performed the day after sampling. "Final Status" gamma scan also performed after sampling.	Data quality issue for FSS samples with low activities for Bi-214, Pb-214 and Ac-228. “Characterization” gamma scan performed the day after sampling. "Final Status" gamma scan also performed after sampling.	Explain why gamma scans were conducted before sampling.

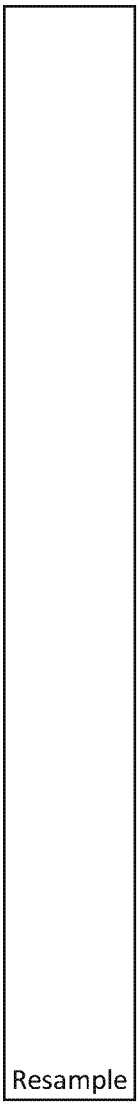

Resample

142	SU 2	K-40 Characterization and FSS box plot differ markedly; mean characterization activity is abnormally low (1.68 pCi/g) vs. FSS mean activity (7.94 pCi/g).	NA	Characterization and final systematic samples collected in Survey Units 1 and 2 are representative of two different soils, separated by what was defined in the FSSR as a second subsurface structure. Characterization samples were collected from above the subsurface structure, and final systematic samples were collected below the subsurface structure, where the FSSR identified the original footprint was located.

One-minute static counts collected at each of the 16 systematic locations on 02/08/2007 by J. Hubbard. Gamma static counts ranged between 2,535 and 4,607 counts per minute (cpm). "Characterization" gamma scan (100% coverage) performed 09/006/2006 (the day after sampling) by J. Hubbard. Range was between 2,000 and 6,000 cpm – less than the investigation level of 6,092 cpm. Background rate was 5,400 cpm.	
"Final Status" gamma scan performed 02/08/2007 (the day after sampling) by J. Hubbard. Range was between 4,900 and 6,000 cpm - less than background +3 sigma (σ) investigation level of 6,581 cpm. Background rate was 5,100 cpm.	All Final Systematic samples were collected on 02/07/2007. FSS samples were collected after confirmatory/biased samples which were collected on 09/05/2006. Most FSS samples (14 of 16) were analyzed within 3 working days; the other two FSS samples were analyzed within 1 working day. Onsite and offsite Data were consistent.

One FSS sample had a near-zero result for Bi-214, sample 6PB142SU2-018. The Pb-214 result was positive at 0.23 pCi/g, but the Ra-226 result was also negative. This occurrence does not indicate potential data falsification. There was also one negative Ac-228 FSS result. For sample 6PB142SU2-019, other thorium-series nuclide results were positive, 0.13 pCi/g for Pb-212 and 0.11 pCi/g for Tl-208, but Bi-212 activity was also negative.	1	J Hubbard/ D Rosengat han	NA	1	“Characterization” gamma scan performed the day after sampling. "Final Status" gamma scan also performed after sampling.	1

“Characterization” gamma scan performed the day after sampling. "Final Status" gamma scan also performed after sampling.	Data quality issue for FSS samples with low activities for Bi-214, Pb-214 and Ac-228. “Characterization” gamma scan performed the day after sampling. "Final Status" gamma scan also performed after sampling.	Explain why gamma scans were conducted before sampling.

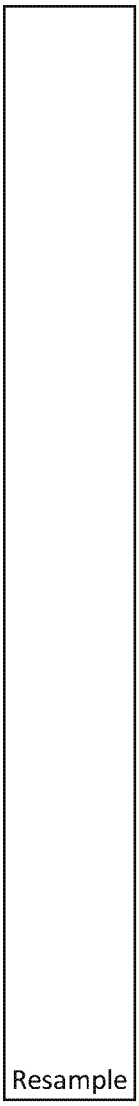

Resample

142	SU 3	NA	NA	Characterization and final systematic samples collected in Survey Units 1 and 2 are representative of two different soils, separated by what was defined in the FSSR as a second subsurface structure. Characterization samples were collected from above the subsurface structure, and final systematic samples were collected below the subsurface structure, where the FSSR identified the orginal building footprint was located.

"Characterization" gamma scan (100% coverage) performed 09/06/2006 (the day after sampling) by J. Hubbard. Range was between 2,000 and 6,000 cpm – less than the investigation level of 6,092 cpm. Background rate was 5,400 cpm. "Final Status" gamma scan performed 02/08/2007 (the day after sampling) by J. Hubbard. Range was between 4,900 and 6,000 cpm - less than the background +3 sigma (σ) investigation level of 6,581 cpm. Background rate was 5,100 cpm. One-minute static counts collected at each of the 22 systematic locations on 02/08/2007 by J. Hubbard. Gamma static counts ranged between 3,034 and 5,841 counts per minute (cpm).	Most FSS samples (20 of 22) were analyzed within 3 working days; the other two FSS samples were analyzed within 1 working day. Onsite and Offsite data were consistent

Two FSS samples had zero (0 pCi/g) results for Bi-214, samples 6PB142SU3-024 and 6PB142SU3-025. For sample 6PB142SU3-024, other radium-series results were mixed; the Pb-214 result was 0.39 pCi/g, however the Ra-226 result was negative at -0.44 pCi/g. For sample 6PB142SU3-025, other radium-series nuclide results were also mixed; the Pb-214 result was 0.30 pCi/g, however the Ra-226 result was negative at -0.50 pCi/g.	1	J Hubbard/ D Rosengat han	NA	1	"Final Status" gamma scan performed 02/08/2007 (the day after sampling) by J. Hubbard. Range was between 4,900 and 6,000 cpm - less than the background +3 sigma (σ) investigation level of 6,581 cpm. Background rate was 5,100 cpm. All Final Systematic samples were collected on 02/07/2007.	1

“Final Status” gamma scan performed 02/08/2007 -the day after sampling.	Data quality issue for FSS samples low activities for Bi-214, Pb-214 and Ac-228. "Final Status" gamma scan performed after sampling.	Explain why the gamma scan was performed on 2/8/07 and FSS sampling was sampled 2/7/07

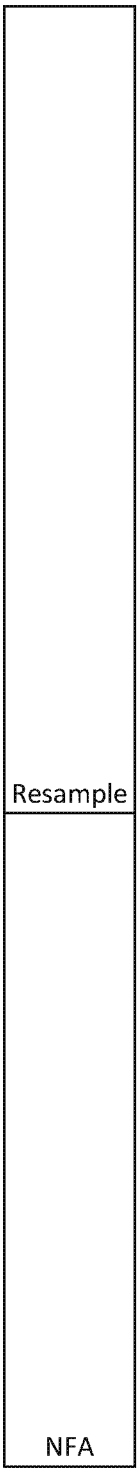

Resample

157	SU 5	NA	Final Systematic samples indicate the potential for at least two different data populations for Bi-214 and K-40.	several rounds of soil excavated. SU-5 had 20 FSS Samples, 6 remedial action biased samples, and 20 systematic characterization samples collected.
157	SU 7	NA	Final Systematic samples indicate the potential for at least two different data populations for Bi-214 and K-40	0 rounds of excavation, no bias samples collected

Scan measurements were taken on 01/06/2010, with 700 total readings taken. None of the reading exceeded an investigation level (3 sigma, based on a background area average). Static measurements were taken on three different dates – 01/06/2010, 01/29/2010, and 3/04/2010. No measurements exceeded the investigation level (3 sigma). The scan measurements do show correlation to the static measurements	Data for comparison is limited since only two samples were sent to the offsite laboratory for analysis.
Scan measurements were taken on 03/11/2010, with 1,631 total readings taken. None of the reading exceeded an investigation level (3 sigma, based on a background area average). Static measurements were taken on 03/11/2010 at each sampling location associated with the FSS samples, resulting in 19 measurements. No measurements exceeded the investigation level (3 sigma).	Data for comparison is limited.

Four out of 20 gamma spec reports for FSS samples had deviation between sample count date and report date.	0	No Scan/Static Surveyor Name Provided	No Scan/Static Surveyor Name Provided	1	Sample 19157-S0005-F198-01 was counted out of sequence and 1 working day after all other FSS samples. Four out of 20 gamma spec reports for FSS samples had deviations between sample count date and report date. Static readings were collected over a period of three months.	0
NA	NA	No Static/Surveyor Name Provided	No Static/Surveyor Name Provided	0	NA	0

NA	NA	Explain why soil sample 19157-S0005 was counted out of sequence and four out of the 20 gamma spec reports for FSS samples had deviations between sample count date and report date. Also why static reading were collected over a period of three months.
NA	Ten out of 20 gamma spec reports for FSS samples had deviations between sample count start time and the analysis time when the gamma report was generated. Six samples (234, 235, 238, 245, 246, and 251) were counted on 03/12/2010, but the gamma reports were generated on 03/15/2010. These reports appear to have been reviewed and had had replacement reports generated after making a minor correction. Samples 240, 243, 249, and 250 were counted on 03/12/2010 and 03/15/2010, but the gamma reports were not generated until 04/21/2010 and 04/22/2010. There is no discussion of why the reports were generated 45 days after the samples were counted, or what changes were made, if any. The results do not appear to be different from other sample results where the gamma reports were generated at the end of the sample count.	Explain the delay in generating the gamma reports after 3-45 days after the samples were counted. Also explain the two different data populations for K-40.


Resample
NFA